CLASSIFICATION OF SOUTHWESTERN MONTANA PLANT COMMUNITIES: EMPHASIZING THOSE OF DILLON RESOURCE AREA, BUREAU OF LAND MANAGEMENT

Stephen V. Cooper[1], Peter Lesica[1], Robert L. DeVelice[2] and Timothy McGarvey[1]

[1]Montana Natural Heritage Program
1515 East 6th Avenue, Helena, MT 59620

[2]U. S. Forest Service
Chugach National Forest
201 East 9th Avenue
Anchorage, Alaska 99501

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ABSTRACT

The vegetation classification of southwestern Montana has re
through the rangeland studies of Mueggler and Stewart (1980
of Pfister et al. (1977), the riparian/wetland treatment of Hans
synthesis of Cooper and Lesica (1992). Most recently DeVeli
review of existing information and cross-correlation of southv
with those of contiguous states, inventoried southwestern cou
Bow) targeting for field sampling (52 plots) the most neglecte
and grasslands. Summer 1992 plots were taken throughout D
within/without exclosure vegetation contrasts. The summer o
areas (138 plots, only on BLM holdings) presumed to harbor
inadequately described community types. Using a combinatic
techniques, two-way indicator species analysis (TWINSPAN)
analysis (DCA), and subjective construction of synthesis and
STRATA in ECAD) 60 community types were identified and
have not previously been described in the western United Stat
previously reported in Montana. All ten of these types are pu
Montana. A total of 162 community types have now been do
Montana, 58 of which are uncommon or rare (Heritage Progra

CONTENTS

INTRODUCTION

This report constitutes both an update and terminal report for community survey work conducted in the southwestern Montana, where the focus of inventory was BLM lands within the Dillon Resource Area (RA), to a lesser extent the Headwaters RA and peripherally the Garnet RA. We emphasized locating, sampling and describing what appeared to be previously undescribed communities and common communities in good to excellent condition (free of disturbance). The comprehensive classification is based on the integration and synthesis of extent data and newly sampled plots. This resulting classification with its accompanying vegetation key will be useful for the identification of community type, especially sensitive ones and natural areas where management prescriptions need adjusting to maintain habitat values. An important function of the classification is to serve as a surrogate for the categorization of environmental variation; it also serves as a reference system for baseline monitoring of environmental impacts and vegetation recovery .

This publication represents one accomplishment in the course of developing a comprehensive classification of Montana's plant communities that will give land managers and researchers a state-wide perspective (national when cross-correlated with other state classifications) of distribution and variation. This perspective is priceless when identifying areas of crucial importance for conservation and for making sound management prescriptions or predictions regarding future desired conditions.

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R. DeVelice appreciates the assistance provided by Peter Achuff and Alistair McAlpine in initiating fieldwork summer 1991. Bonnie Heidel, P. Achuff, Ken Scow, Jim Vanderhorst and Lisa Roe provided valuable assistance in voucher specimen identification; Jim Vanderhorst and Lisa Roe contributed crucial plot information. Margaret Beer, Cedron Jones, Debbie Dover and Diana Schwab are appreciated for their conscientious efforts in data entry and quality control. We also acknowledge that contract computer programmers Larry Gangi, Michael Quinn and John Caratti specially accomodated our requests for rapid revisions in the "beta test" version of ECADS and the analysis programs encompassed within; their efforts were instrumental in the production of this report.

PREVIOUS RESEARCH/SURVEYS

The most poorly described of Montana's vegetation types are the grasslands and shrublands, yet they constitute about 65% of the Montana landscape. By contrast, the classification of forest types, with the exception of seral stages is largely complete. Filling the gaps in Montana's grassland/shrubland community type characterization is a priority focus of the Montana Natural Heritage Program's ecological classification project, of which this study is a component. This study constitutes a major and necessary step to producing a comprehensive classification of Montana plant communities.

Vegetation studies characterizing Montana's grassland and shrubland, with the exception of those of Mueggler and Stewart (1980) for western valleys and slopes and DeVelice et al. (1991) for the northeastern quarter, have been circumscribed in geographical and ecological scope. After these, the most ambitious studies are those of Jorgensen (1979) and Harvey (1982) in central Montana and Hansen (1985) and Hansen and Hoffman (1985) for southeastern Montana.

The upland forest classification of Pfister et al. (1977) treated virtually all of the state, but at a low intensity of sampling, particularly in the southeastern portions; this work has been refined and extended to outlying ranges by the reports of Cooper and Pfister (1981; 1985), Roberts (1980), Hansen and Hoffman (1985) and Hoffman and Hansen (1985). A comprehensive classification of all riparian/wetland sites, regardless of lifeform dominance, is nearing completion under the aegis of the Montana Riparian/Wetlands Association (Hansen et al. 1991). Cooper and Lesica (1992) have developed, based on low intensity sampling, an alpine classification for the southwestern portion.

Prior to commencing field sampling, a review of literature and data of previous studies was employed to develop a preliminary or "working list" version of southwestern Montana's plant communities. Forested communities in the study area have been, in the main, described by Pfister et al. (1977) and Steele et al. (1983) whose communities of western Wyoming and eastern Idaho spill over into Montana. Mueggler and Stewart (1980) provide a relevant grassland and shrubland classification for the area (even using sampling techniques comparable to those used in our study) but stressed sampling common communities of only those lands under Forest Service jurisdiction. We consider the present study and its immediate precursor from the Montana Heritage Program (DeVelice 1992) to be both expansions and refinements of Mueggler and Stewart's treatment; expansions by virtue of sampling new habitats encompassed within BLM holdings and a refinement by paying close attention to ecological distinctions revealed by tracking the subspecies of big sagebrush (and other Artemisia taxa) and by increasing the n-number for several community types in order to partition the variability within.

STUDY AREA

This report is generated from areas sampled within the southern portion of Silver Bow County, the western portion of Madison County and the eastern and southernmost portion of Beaverhead County.

Physiography

The study area encompasses approximately 4.2 million acres and ranges in elevation from approximately 4,500 ft. on the Beaverhead River at Silver Star to 11,150 ft. at the summit of Torrey Peak in the East Pioneer Mountains. This area's diverse topography and high relief give rise, when overlain on a broad spectrum of parent material types ranging from intrusive and extrusive volcanics, sedimentaries, both calcareous and non, coarse-grained metamorphic to all textures of valley fill sediment, to an abundance of unique substrates and soils. The Pioneer, Beaverhead, Gravelly, Snowcrest, Tendoy and Centennial Ranges all experienced Pleistocene alpine glaciation (Montagne 1972) and today support alpine community types.

Climate

All of the study area experiences, with local variations and permutations, a continental climate with cold relatively dry winters with the months of greatest precipitation being May and June. Summer are relatively dry with orographically generated precipitation events (moisture source often being northward-flowing Gulfstream air masses) having their greatest frequency and impact of anywhere in Montana in these southwestern mountains. Average annual precipitation varies from over 50 inches at the Pioneer Mountains crest to between 8 and 16 inches throughout the bulk of the study area (see sheets 3 and 4 in Ross and Hunter 1976). The average length of the freeze-free season varies from less than 30 days to more than 70 days, at highest and lowest elevations, respectively (see Figure 13 in Montagne et al. 1982).

METHODS

Data Collection

Field sampling was conducted in two phases; an initial phase was centered on ten areas with acreage varying from 50 to 2,400 acres, selected by personnel of the Bureau of Land Management and sampled by R. DeVelice (1992). General descriptions of each of these ten sites including assessment of their biodiversity significance, current and past land use and suggested conservation management needs, appear in Volume II, Appendix A. A second phase of field sampling was conducted by S. Cooper and P. Lesica based on reconnaissance information collected by Lesica, J. Vanderhorst and B. Heidel in the course of inventorying for threatened and endangered species in the Centennial Valley and the Tendoy Range and surrounding valley lands.

In each of these areas sampling centered on putative rare or previously undescribed communities and on common communities in good to excellent condition (based on standard range criteria). To minimize the confounding influence of disturbance (man-induced) on vegetation patterns, areas intensively grazed, herbicide treated, mechanically disturbed, artificially seeded or irrigated were not sampled. Plots (1/10 acre, radius 36.8 ft.) were established within homogeneous appearing, in both vegetation composition and site factors, portions of stands. Within a given area an attempt was made to sample the vegetation characteristic of different landscape positions

or at least capture the communities distinctly different in composition occurring within a circumscribed topography. Plot selection focused on existing stands of vegetation with the objective of describing the composition of seral, as well as mature vegetation; however, bias toward more mature stages is implicit through the selection of undisturbed sites.

All plot information was collected on the Natural Heritage Program Community Survey Form (Figure 1) and the Reconnaissance Soil Characterization Form (Figure 2); the Site Survey Form (Figure 3) was completed for only the initial ten sites sampled. DeVelice (1991) gives instructions for completing these forms. The Community Survey Form is a derivation of the General Plot Data and Ocular Plant Species Data Forms employed by the USDA Forest Service as a portion of their ECODATA (USDA 1987) community sampling package. All plot information regarding species composition and site factors (except soil properties) has been recoded for accommodation within the various databases of E.C.A.D.S (Ecological Classification And Description System) the evolutionary descendent of ECODATA.

Within each 375 m^2 (used through 1992) or 1/10 acre plot (radii respectively of 35.8 ft and 37.3 ft.) all vascular species were recorded and their height and canopy cover (Daubenmire 1959) estimated using a 12 class scale. Abiotic site information, including elevation, aspect, slope, parent material, landform, slope position and erosion characterisitics, was also recorded for all plots. Only the initial 52 plot sample of DeVelice (1992) systematically collected information necessary to determine soil subgroup and water holding capacity from a 20-inch deep reconnaissance soil pit.

Data Analysis

Analysis constituted a combination of ordination, to describe general patterns of communities in relation to environmental gradient, and classification to ascertain and describe community types. Objective classification was accomplished using two-way indicator species analysis (TWINSPAN, Hill 1979a) whereas STRATA (USDA Forest Service) was employed to subjectively allocate plots to community types based on vegetation similarity values as well as subjectively perceived similarities and differences in site factors and treatments. Ordination was performed using detrended correspondence analysis (DECORANA, Hill 1979b). Species cover values for each plot constituted the input data. Both TWINSPAN and DECORANA are based on the mathematical strategy (i.e., reciprocal averaging; Hill 1979a, b) and thus afford direct comparison between the results of the two techniques. No data transformations were employed and all default options int TWINSPAN algorithm were used, except that pseudospecies cut levels were set at 0, 5 and 20 percent cover. All default options were employed when running the ordination algorithms. To reduce variation (beta diversity) when running ordinations datasets were stratified by lifeform with 10 percent combined cover of trees or shrubs sufficient to place plots within these lifeform groups. Forb-dominated plots were not separated from graminoid-dominated. Further reduction in beta diversity and resulting clarity of vegetation patterns was achieved by separating the obviously moist to wet-site plots from those of uplands.

Given the existence of numerous accepted classifications and not wanting to create unnecessary

Fig. 1. Example of community survey form employed in sampling.

Fig. 1. (Continued).

Fig. 2. Example of soil reconnaissance characterization form employed.

Fig. 2. (Continued).

Fig. 3. Example of site survey form employed in sampling.

Fig. 3. (Continued).

confusion, we were conservative in recognizing new community types. TWINSPAN was particularly effective in pointing to particular plots that were placed in TWINSPAN classes that differed significantly from those categories they would be placed in existing classifications or following existing keys. TWINSPAN is also efficiently employed in constructing keys, i.e. looking for diagnostic species and defining appropriate cover values at which to make the breaks between community types. Ordination, in addition to helping refine the classification, assisted in describing and interpreting general patterns of vegetation communities and environment. For example, DECORANA extracts the dominant compositional gradient from the species data matrix. The environmental controls of these compositional gradients are then interpreted based

on comparisons with the abiotic site data.

Taxonomic Considerations

Nomenclature follows Hitchcock and Cronquist (1973) with the following exceptions. *Arabis fecunda* and *Lesquerella paysonii* which follow the treatment of Rollins (1984) and Rollins and Shaw (1973), respectively and *Mertensia lanceolata* which follows Dorn (1984). For woody *Artemisia* species we have followed Dorn (1984), but *Artemisa tridentata*, because of its strong ecotypic differentiation that reveals much about a stand's relative position on a temperature/moisture gradient, we take to the subspecies level via Beetle (1982) and Hironaka et al. (1983). Scientific names of all species in this study amd their six-letter codes according to Ecosystem Classification Handbook, Appendix K (USDA Forest Service 1987) are listed in Appendix XXX. The Natural Heritage Program is commited to employing the synonomy of Kartesz (XXXX) therefore we have added the Western Heritage Task Force Community Classification community name to the subheading of each community type description. However, until the synonomy stabilizes somewhat we have been conservative in referring to our plant community types by the species names referenced to the above-cited schlarly works.

RESULTS AND DISCUSSION

Community Type Classification

Classifying the 250 study plots resulted in defining 60 community types/plant associations. These **and** 102 additional community types documented for southwestern Montana through literature searches and field notes (but not sampled in this study) are listed aphabetically in Appendix A (without regard to life form). The comunity types in **bold** are described in this manuscript (and elsewhere) and the shaded ones have a state rarity status of S3 or less. Reference to literature substantiation of community types undescribed (and described) herein may be found in Cooper and DeVelice (1995).

A provisional dichotomous key (Figure 1) was deemed essential to identifying and accessing information regarding the community types. The key has been constructed by extracting from existing keys, such as those of Mueggler and Stewart (1980) for grassland/shrublands and Hansen et al. (1991) for riparian/wetlands and Pfister et al. (1977) for predominantly upland forests, only those leads which direct one to types which were documented to occur in southwestern Montana. Leads from these various keys were occasionally modified to meet local circumstances. We also created new leads to incorporate information acquired and community types newly described in the course of our sampling and analysis. The prologue to the keys should be consulted before using the keys as some conventions are used that are quite critical to accurate and consistent identification of community types. For example, Daubenmire's (1959) concept of canopy cover was employed by all researchers producing antecedent classifications, the investigators producing this classification and also all data collectors associated with this project. Not using Daubenmire's concept of canopy cover could result in substantial misclassification of vegetation types. The terms common, well represented and abundant,

referring to certain classes of plant canopy cover, have been codified by their consistent use in classifications such as that of Pfister et al. (1977) and Mueggler and Stewart (1980) and various other habitat types classfications throughout the Intermoutain West.

The descriptions of sampled community types constitute the body of the manuscipt and are assembled from sample data, field notes and pertinent literature. Descriptions of some community types are copied verbatim from DeVelice (1993) because there has been no subsequent change in the information available. The order in which the vegetation descriptions appear in the text parallels their positioning in the keys. Overall the keys are arranged by decreasing size of dominant lifeform and within a lifeform group, e.g. shrublands, the types with higher moisture requirements are broken out first. However it should be noted that keys to truly wetland types for any lifeform immediately follow the upland community types for that lifeform. See Hansen et al. (1991, pages 29-31) for a pertinent discussion regarding recognition of Montana wetlands. For determining the degree to which particular species are dependent upon wetlands see Reed (1988); see also Hansen et al. 1991 for abbreviated list (pages 442-446).

Appendix D is a table of average species cover, range of cover values and constancy (percentage of plots of a given community type in which a given species occurs). Appendix D can be profitably employed to check the goodness of fit of a community type arrived at through use of the key, but only when the n-number is sufficiently high; the comparison of the plot composition to that of the constancy/cover table reveals. Abiotic site variables are presented in Appendix E.

Figure 4. Key to the plant associations/community types of southwestern Montana occurring, or hypothesized to occur, on Bureau of Land Management holdings.

This key is generally structured to identify, within lifeform types, the wettest sites first and progresses to successively drier sites. In the following key and main body of text the canopy coverage (c.c.) concept employed is that of Daubenmire (1959); a vertical projection about the outermost perimeter of a plant's canopy expressed as a fraction of the area sampled. The following canopy cover terms and their complements and reproductive success terms are applied when referring to species in the vegetation keys.

Present: trace to 100% canopy coverage (c.c.) versus **Absent:** 0% c.c.
Common: species with 1% ormore c.c. versus **Scarce:** having less than 1% c.c.
Well represented: species with at least 5% c.c. versus **Poorly represented:** less than 5% c.c.
Abundant: species having 25% or greater c.c. versus **Not Abundant:** species having less than 25% c.c.
Reproducing Successfully: Generally at least 10 seedlings or saplings per acre, not confined to microsites.

Caveats when using keys:

1) In applying the key to actual field conditions the definitions cited above may need adjusting to the next lower coverage class, e.g. "well represented" becomes "common." This may be necessary when the closed canopy stage of forest succession obtains, or when grazing pressure has altered community composition.
2) In the case of early successional stages, particularly with regard to potentially forested sites, the current stand composition may not "key out" to a described c.t. or h.t.; this is because the keys are intended for use with relatively mature vegetation. See Keane and Arno (1987) or Steele (1988) for an approach dealing with classification and description of seral vegetation (forest).
3) The keys and community type descriptions are arranged by decreasing size of the dominant lifeform and within lifeform the upland sites are placed first followed by wetland/riparian types. The order of occurrence of type descriptions parallels their placement in the key. Some community types will key out in both upland and wetland keys because their habitat conditions are known to span that range.
4) The dichotomous key is only a convenience for identifying commuity types; it is not the classification! Validate your determination of c.t. by comparing vegetation/site characteristics with parameters of c.t. descriptions. Note, only the community types for which field data (plots) exit are described; in the key these types are in **bold type**.

Instructions:

1) Homogeneity of site (environment and history of use) and vegetation are primary considerations in plot location selection. The plot being being classified should be representative of the stand as a whole, if not, then relocate plot and re-estimate coverages.
   a) Note that environmental gradients are often steep and that the size of homogeneous vegetatin types may be extremely restricted ($< 10m^2$)
   b) Homogeneity is most easity appraised as an area supporting a particular suite of dominants and subordinate indicator species.
2) Accurately identify and estimate canopy cover for all indicator species used in the key.
3) On sites where the vegetation is obviously depauperate (unusually sparse) due to heavy grazing, browsing, or closed canopy stage of forest vegetation succession adjust the key downward to reflect the reduced canopy cover (e.g." well represented" would become "common").
4) If severely disturbed or early seral conditions are encountered, the c.t. (at least as regards potential) is best determined by extrapolating from the nearest relatively undisturbed mature stand with similar site conditions (slope, aspect, elevation, and soils).

KEY TO LIFEFORM CATEGORIES

1. Trees (coniferous or deciduous), with at least 25% canopy cover ..... Forests and Woodlands
1. Trees with less than 25% canopy cover 2

2. Shrub species (from prostrate forms to tall extremes at 25 ft.) with a combined cover of at least 10% canopy cover ..... Shrub Communities
2. Shrub species combined cover of less than 10% 3

3. Herbaceous spp. (forbs and graminoids) having at least 5% canopy cover ..... Herbaceous Communities
3. Herbaceous spp. with less than 5% canopy cover ..... Depauperate sites

KEY TO UPLAND (NON-WETLAND) FORESTS AND WOODLANDS

[based largely on Pfister et al. (1977) and Steele et al. (1983)]

Forest Series Key

1. *Abies lasiocarpa* present and reproducing successfully ..... *Abies lasiocarpa* Series
1. *A. lasiocarpa* absent or not reproducing successfully 2

2. *Picea* spp. (mostly *P. engelmannii*) present and reproducing successfully ..... *Picea* spp. Series
2. *Picea* spp. absent or not reproducing successfully 3

3. *Pinus albicaulis* present and reproducing successfully; *A. lasiocarpa* and *Picea* spp. may be present with more than 10 seedlings/saplings but they are stunted, unthrifty specimens ..... *Pinus albicaulis* Series
3. P. *albicaulis absent* or not reproducing successfully 4

4. *Pseudotsuga menziesii* present and reproducing successfully ..... *Pseudotsuga menziesii* Series
4. *P. menziesii absent* or not reproducing successfully 5

5. *Pinus flexilis* present and reproducing successfully (though episodically) ..... *Pinus flexilis* Series
5. *P. flexilis* absent or not reproducing successfully 6

6. *Pinus contorta* occurring in virtually pure stands, not necessarily reproducing, lacking evidence as to climax potential ..... *Pinus contorta* Series
6. *P. contorta* absent or not reproducing successfully 7

7. *Pinus ponderosa* present, not accidental or confined to microsites ..... *Pinus ponderosa* Series
7. *P. ponderosa* absent or accidental 8

8. *Juniperus scopulorum* the indicated site dominant ..... *Juniperus scopulorum* Series
8. *J. scopulorum* not the indicated site dominant 9

9. *Cercocarpus ledifolius** the indicated site dominant ..... *Cercocarpus ledifolius* Series
9. *C. ledifolius* not the indicated site dominant 10

10. *Populus tremuloides*, *P. trichocarpa* or *Populus angustifolia* with at least 25% canopy cover, individually or combined cover, or dominate the canopy; conifers, if present, only scattered and in younger age or size classes (seedling & sapling) ..... *Populus* spp. Forest
10. Not as above ..... Undefined/undocumented Forest C.T.

* *Cercocarpus ledifolius* is generally considered a shrub in some floras, but those with experience in the Great Basin may consider it a tree and so we have included it here for completeness.

Key to plant associations/community types within *Abies lasiocarpa* Series

I. Sites at or above the cold limits of *Pseudotsuga menziesii* and also meeting one of following criteria;
  a. *Pinus albicaulis* well represented as either seral or climax component;
  b. *Luzula hitchcockii* present, not related to mirosites;
  c. *Ribes montigenum* present;
  d. Stands at upper timberline, growth stunted, tree height not much exceeding 50 ft.;
    UPPER SUBALPINE & TIMBERLINE HABITATS ..... lead #15
I. Not as above 1

1. One, or any combination of, the following species well represented: *Calamagrostis canadensis*, *Senecio triangularis*, *Ledum glandulosum* ..... *Abies lasiocarpa/Calamagrostis canadensis* p. a.
1. *C. canadensis*, *S. triangularis*, *L. glandulosum*, singly or in combination, poorly represented 2

2. Two of the following three moist-site forbs present: *Streptopus amplexifolius*, *Galium triflorum*, *Actaea rubra*: or one common and not confined to microsites ..... *Abies lasiocarpa/Galium triflorum* p. a.
2. One or less of the above cited forbs present and scarce 3

3. *Menziesia ferruginea* well represented ..... *Abies lasiocarpa/Menziesia ferruginea* p.a.
3. *M. ferruginea* poorly represented 4

4. *Linnaea borealis* common ..... *Abies lasiocarpa/Linnaea borealis* p.a.
4. *L. borealis* scarce 5

5. *Vaccinium cespitosum* common ..... *Abies lasiocarpa/Vaccinium cespitosum* p.a.
5. *V. cespitosum* scarce 6

6. *Alnus sinuata* well represented ..... *Abies lasiocarpa/Alnus sinuata* p.a.
6. *A. sinuata* poorly represented 7

7. *Xerophyllum tenax* common ..... *Abies lasiocarpa/Xerophyllum tenax* p.a.
7. *X. tenax* scarce 8

8. *Vaccinium globulare* well represented ..... *Abies lasiocarpa/Vaccinium globulare* p.a.
8. *V. globulare* poorly represented 9

9. *Vaccinium scoparium* (including *V. myrtillus*) well represented ..... *Abies lasiocarpa/Vaccinium scoparium* p.a.
9. *V. scoparium* (and *V. myrtillus*) poorly represented 10

10. *Thalictrum occidentale* or *Osmorhiza chilensis* or *O. depauperata* well represented ..... ***Abies lasiocarpa/Thalictrum occidentale* p.a.**
10. *T. occidentale*, *O. chilensis*, or *O. depauperata* poorly represented 11

11. *Clematis pseudoalpina* or *C. tenuiloba* present or *Pinus flexilis* common (sites invariably calcareous) ..... *Abies lasiocarpa/Clematis pseudoalpina* p.a.
11. *C. pseudoalpina* and *C. tenuiloba* absent and *P. flexilis* scarce 11

12. *Calamagrostis rubescens* well represented ..... ***Abies lasiocarpa/Calamagrostis rubescens* p.a.**
12. *C. rubescens* poorly represented 13

13. *Carex geyeri* well represented ..... ***Abies lasiocarpa/Carex geyeri* p.a.**
13. *C. geyeri* poorly represented 14

14. *Arnica cordifolia* the undergrowth dominant ..... ***Abies lasiocarpa/Arnica cordifolia* p.a.**
14. *A. cordifolia* not the undergrowth dominant ..... Underfined p.as. within *Abies lasiocarpa* Series

15. *Abies lasiocarpa* and *Picea engelmannii* scarce and unthrifty specimens; *Pinus albicaulis* the indicated dominant tree at future longterm stable state ..... *Pinus albicaulis* Series
15. Not as above 16

16. Timberline habitats; *A. lasiocarpa* stunted, *P. contorta* scarce, *Menziesia ferruginea* absent ..... ***Pinus albicaulis-Abies lasiocarpa* p.as.**
16. Not as above, forest environments with *A. lasiocarpa* at least 50 ft. at maturity 17

17. *Luzula hitchcockii* common ..... *Abies lasiocarpa/Luzula hitchcockii* p.a.
17. *L. hitchcockii* scarce, of microsites 18

18. *Vaccinium scoparium* (including *V. myrtillus*) well represented; *P. albicaulis* persisting, even reproducing, well into longterm stable state due to open canopy nature of stand structure ..... *Abies lasiocarpa-Pinus albicaulis/Vaccinium scoparium* p.a.
18. Not as above 19

19. *Ribes montigenum* present and not relegated to microsites ..... ***Abies lasiocarpa/Ribes montigenum* p.a.**
19. *R. montigenum* absent ..... Undefined p. as. within *Abies lasiocarpa* Series

Key to Plant Associations/Community Types within *Picea* spp. (mostly *P. engelmannii* and *P. engelmannii* x *P. glauca* hybrids) Series

1. *Equisetum* spp. (usually *E. arvense*) abundant ..... ***Picea/Equisetum arvense* p.a.**
1. *Equisetum* spp. not abundant 2

2. *Calamagrostis canadensis*, *C. stricta*, or *Senecio triangularis* common *Picea spp./Calamagrostis canadensis* c.t.
2. *C. canadensis*, *C. stricta*, and *S. triangularis* scarce 3

3. Two of the following moist-site forbs present or one or more common; *Streptopus amplexifolius*, *Galium triflorum*, *Actaea rubra* ..... ***Picea spp./Galium triflorum* p.a.**
3. Not as above 4

4. *Linnaea borealis* common ..... *Picea spp./Linnaea borealis* p.a.
4. *L. borealis* scarce 5

5. *Physocarpus malvaceus* well represented ..... *Picea spp./Physocarpus malvaceus* p.a.
5. *P. malvaceus* poorly represented 6

6. *Smilacina stellata* or *Thalictrum occidentale* common ..... *Picea spp./Smilacina stellata* p.a.
6. S. stellata and T. occidentale scarce 7

7. *Senecio streptanthifolius* present; undergrowth depauperate ..... ***Picea spp./Senecio streptanthifolius* p.a.**
7. *S. streptanthifolius* absent, undergrowth various ..... Undefined p.as./c.ts within *Picea* spp. Series

Key to Plant Associations/Community Types within the *Pseudotsuga menziesii* Series

1. Habitats on steep slopes (generally > 40%) composed of unstable substrates, from gravel to coarse rock, and lacking soil development; undergrowth canopy cover sparse and spatially quite variable..... ***Pseudotsuga menziesii*/Scree c.t.**
1. Not as above; sites with some soil development due to stability of substrate; undergrowth cover uniform reflecting lack of microsites 2

2. *Cornus stolonifera* , *Salix boothii, S. bebbiana*, *Actaea rubra* or *Equisetum arvense* common, singly or in their combined cover ..... *Pseudotsuga menziesii/Cornus stolonifera* p.a.
2. Above listed species singly or their combined cover scarce 3

3. *Vaccinium cespitosum* common ..... *Pseudotsuga menziesii/Vaccinium cespitosum* p.a.
3. *V. cespitosum* scarce 4

4. *Linnaea borealis* common ..... *Pseudotsuga menziesii/Linnaea borealis* p.a.
4. *L. borealis* scarce 5

5. *Physocarpus malvaceus* well represented ..... ***Pseudotsuga menziesii/Physocarpus malvaceus* p.a.**
5. *P. malvaceus* poorly represented 6

6. *Vaccinium globulare* well represented ..... *Pseudotsuga menziesii/Vaccinium globulare* p.a.
6. *V. globulare* poorly represented 7

7. *Symphoricarpos albus* well represented ..... ***Pseudotsuga menziesii/Symphoricarpos albus* p.a.**
7. *S. albus* poorly represented 8

8. *Calamagrostis rubescens* well represented ..... ***Pseudotsuga menziesii/Calamagrostis rubescens*** **p.a.**
8. C. rubescens poorly represented 9

9. *Carex geyeri* well represented ..... ***Pseudotsuga menziesii/Carex geyeri*** **p.a.**
9. *C. geyeri* poorly represented 10

10. *Spiraea betulifolia* well represented ..... *Pseudotsuga menziesii/Spiraea betulifolia* p.a.
10. *S. betulifolia* poorly represented 11

11. *Arctostaphylos uva-ursi* well represented ..... *Pseudotsuga menziesii/Arctostaphylos uva-ursi* p.a.
11. *A. uva-ursi* poorly represented 12

12. *Juniperus communis* (or *J. horizontalis*) the undergrowth dominant .....
..... *Pseudotsuga menziesii/Juniperuscommunis* p.a.
12. *J. communis* and *J. horizontalis* not the undergrowth dominants 13

13. *Symphoricarpos oreophilus* well represented ..... ***Psuedotsuga menziesii/Symphoricarpos oreophilus*** **p.a.**
13. *S. oreophilus* poorly represented 14

14. *Arnica cordifolia* or *Antennaria* racemosa the dominant undergrowth species .....
..... ***Pseudotsuga menziesii/Arnica cordifolia*** **p.a.**
14. Neither *A. cordifolia* nor *A. racemosa* the dominant undergrowth species 15

15. *Cercocarpus ledifolius* well represented ..... ***Pseudotsuga menziesii/Cercocarpus ledifolius*** **p.a.**
15. *C. ledifolius* poorly repressented 16

16. *Festuca scabrella* common ..... *Pseudotsuga meziesii/Festuca scabrella* p.a.
16. *F. scabrella* scarce 17

17. *Festuca idahoensis* common ..... ***Pseudotsuga menziesii/Festuca idahoensis*** **p.a.**
17. *F. idahoensis* scarce 18

18. *Agropyron spicatum* well represented ..... *Pseudotsuga menziesii/Agropyron spicatum* p.a.
18. *A. spicatum* poorly represented ..... Undefined p.a./c.t. of *Pseudotsuga menziesii* Series

Key to Plant Associations/Community Types within the *Pinus flexilis* Series

1. *Cercocarpus ledifolius* well represented ..... ***Pinus flexilis/Cercocarpus ledifolius*** **p.a.**
1. *C. ledifolius* poorly represented 2

2. *Festuca scabrella* common ..... ***Pinus flexilis/Festuca scabrella*** **p.a.**
2. *F. scabrella* scarce 3

3. *Festuca idahoensis* well represented ..... ***Pinus flexilis/Festuca idahoensis*** **p.a.**
3. *F. idahoensis* poorly represented 4

4. *Juniperus communis* or *J. horizontalis* well represented ..... ***Pinus flexilis/Juniperus communis*** **p.a.**
4. *J. communis* and *J. horizontalis* poorly represented 5

5. *Agropyron spicatum* well represented ..... ***Pinus flexilis/Agropyron spicatum*** **p.a.**
5. *A. spicatum* poorly represented ..... Undefined p.as./c.ts. within *Pinus flexilis* Series

Key to Plant Associations/Commuity Types within the *Pinus albicaulis* Series

1. *Carex geyeri* well represented ..... *Pinus albicaulis/Carex geyeri* p.a.
1. *C. geyeri* poorly represented 2

2. *Juniperus communis*, *Astragalus miser*, or *Shepherdia canadensis* well represented or dominant, either singly or collectively ..... *Pinusalbicaulis/Juniperus communis* p.a.
2. Not as above 3

3. *Festuca idahoensis* common ..... ***Pinus albicaulis/Festuca idahoensis* p.a.**
3. *F. idahoensis* scarce ..... Undefined p.as./c.ts. within the *Pinus albicaulis* Series

Key to Plant Associations/Community Types within the *Pinus contorta* Series

1. *Vaccinium cespitosum* common ..... *Pinuscontorta/Vaccinium cespitosum* c.t.
1. *V. cespitosum* scarce 2

2. *Linnaea borealis* common ..... *Pinus contorta/Linnaea borealis* c.t.
2. *L. borealis* scarce 3

3. *Vaccinum scoparium* well represented ..... *Pinus contorta/Vaccinium scoparium* c.t.
3. *V. scoparium* poorly represented 4

4. *Calamagrostis rubescens* well represented ..... *Pinus contorta/Calamagrostis rubescens* c.t.
4. *C. rubescens* poorly represented 5

5. *Carex geyeri* well represented ..... ***Pinus contorta/Carex rossii* c.t.**
5. *C. geyeri* poorly represented 6

6. *Purshia tridentata* ..... *Pinus contorta/Purshia tridentata* p.a.
6. *P. tridentata* ..... Undefined p.as./c.ts. within the *Pinus contorta* Series

Key to Plant Associations/Community Types within the *Juniperus scopulorum* Series

1. Cottonwood (*Populus* spp.) species well represented or *Cornus stolonifera*, *Poa pratensis*, *Agrostis stolonifera*, singly or combined cover, common; riparian sites ..... *Juniperusscopulorum/Cornus stolonifera* p.a.
1. Cottonwood (*Populus* spp.) species poorly represented and *C. stolonifera*, *P. pratensis*, and *A. stolonifera* , singly or combined cover, scarce 2

2. *Cercocarpus ledifolius* well represented ..... ***Juniperus scopulorum/Cercocarpus ledifolius* c.t.**
2. *C. ledifolius* poorly represented 3

3. *Artemisia tridentata* (usually subspecies *vaseyana* or *tridentata*) well represented ..... ***Juniperus scopulorum/Artemisia tridentata* c.t.**
3. *A. tridentata* poorly represented ..... Undescribed p.as./c.ts. within the *Juniperus scopulorum* Series

Key to Plant Association/Community Types within the *Populus tremuloides*, *P. trichocarpa* and *P. angustifolia* Series (including wetland/riparian types)

1. *Populus angustifolia* and *P. trichocarpa*, alone or combined canopy cover, at least 25% or the dominant species 2
1. *P. angustifolia* or *P. trichocarpa* with < 25% canopy cover and not the dominant species, *P. tremuloides* having at least 15% cover 9

2. *Populus trichocarpa* with greater canopy cover than *P. angustifolia* 3
2. *P. trichocarpa* with less canopy cover than *P. angustifolia* 6

3. Site recently deposited alluvial bar or overflow reach with seedling and sapling size classes (dbh <5.0 in.) dominating ..... *Populus trichocarpa*/Recent Alluvial Bar c.t.
3. *P. trichocarpa* represented by by pole or mature size classes 4

4. Shrub species, including *Cornus stolonifera* at least common, with 15% canpy cover..... *Populus trichocarpa/Cornus stolonifera* c.t.
4. Shrub species with less than 15% canopy cover, *Cornus stolonifera* scarce .....

5. *Poa pratensis*, *Poa palustris* or *Agrostis alba* abundant, or dominate the undergrowth ..... ***Populus trichocarpa/Poa pratensis* c.t.**
5. Not as above ..... Undefined *Poa trichocarpa* Series c.t./p.a.

6. *Populus angustifolia* seedling or sapling size classes (dbh < 5.0 in.) dominate recently deposited alluvial bars ... *Populus angustifolia*/Recent Alluvial Bar c.t.
6. *P. angustifolia* pole or mature size classes dominate the site, regardless of substrate..... 7

7. Shrub species, including *Cornus stolonifera* at least common, with 15% canopy cover..... *Populus angustifolia/Cornus stolonifera* c.t.
7. Shrub species having less than 15% canopy cover 8

8. *Poa pratensis*, *Poa palustris*, or *Agrostis alba*, singly or combined cover, abundant, or dominant ..... *Populus angustifolia/Poa pratensis* c.t.
8. Not as above ..... Undefined *Poa angustifolia* Series c.t./p.a.

9. *Salix* spp. *Cornus stolonifera* or *Prunus virginiana*, individually or combined canopy cover, well represented ... *Populus tremuloides/Cornus stolonifera* p.a.
9. *Salix* spp. *C. stonifera* and *P. virginiana*, individually or combined cover, poorly represented 10

10. *Thalictrum fendleri*, *T. occidentale*, *Osmorhiza chilensis*, *O. depauperata*, *O. occidentalis*, *Geranium richardsonii* or *G. viscossisimum*, singly or in any combination, having at least 10 % canopy cover ..... *Populus tremuloides/Thalictrum fendleri* c.t.
10. None of the above-listed species, singly or in any combination, totaling 10% cover 11

11. *Calamagrostis rubescens* or *Carex geyeri* dominant, singly or combined cover, at least 10 % ..... *Populus tremuloides/Calamagrostis rubescens* c.t.
11. C. rubescens and C. geyeri or their combined cover not 10%..... 12

12. *Poa pratensis* dominates the undergrowth ..... *Populus tremuloides/Poa pratensis* c.t.
12. *P. pratensis* not the undergrowth dominant..... Undefined/undescribed *Populus tremuloides* Series c.t.

KEY TO UPLAND AND WETLAND SHRUBLANDS, GRASSLANDS, AND FORB-DOMINATED PLANT ASSOCIATIONS & COMMUNITY TYPES

(The first leads (1-48) designate upland followed by wetland-riparian shrubland (1-35); the next leads designate herb-dominated vegetation, uplands (1-33) followed by wetlands(1-25); mostly alpine and upper subalpine non-forest types are arranged in the key following herb-dominated wetlands/riparian)

1. Herbaceous vegetation (graminoids and forbs) dominant; shrubs, if present, widely scattered with coverage less than 5% or are half-shrubs such as *Artemisia frigida* or *Gutierrezia sarothrae* ; if identification of potential natural vegetation is desired determine the fire history of the site .....
   See heading "KEY TO HERB-DOMINATED UPLAND AND WETLAND COMMUNITIES BEGINS HERE"
1. Not as above, woody plants well represented or the site has clues indicating potential to support at least 5% shrub cover ..... See heading "KEY TO UPLAND AND WETLAND SHRUB COMMUNITIES BEGINS HERE"

KEY TO UPLAND AND WETLAND/RIPARIAN SHRUBLANDS BEGINS HERE

1. *Potentilla fruticosa* well represented, often partially obscured by lush herbaceous vegetation (other shrubby taxa may be present) 2
1. *P. fruticosa* poorly represented 6

2. *Deschampsia cespitosa* common (or only present, scattered individuals, under intensive grazing) .....
   ..... ***Potentilla fruticosa/Deschampsia cespitosa* p.a.**
2. *D. cespitosa* scarce 3

3. *Festuca scabrella* common (or only present, scattered individuals, with intensive grazing).....
   ..... *Potentilla fruticosa/Festuca scabrella* p.a.
3. *F. scabrella* scarce 4

4. *Festuca idahoensis* well represented (only common with intensive grazing) .....
   ..... *Potentilla fruticosa/Festuca idahoensis* p.a.
4. *F. idahoensis* poorly represented 5

5. *Potentilla ovina* common, the undergrowth dominant of depauperate undergrowth; water-scoured substrates ....
   ..... ***Potentilla fruticosa/Potentilla ovina* c.t.**
5. Not as above ..... Undefined/unreported p.a./c.t. within *Potentilla fruticosa* alliance

6. *Artemisia cana* well represented (other *Artemisia* taxa may be present)..... 7
6. *A. cana* poorly represented 9

7. *Poa nevadensis*, *P. juncifolia*, or *Carex praegracilis* common ..... *Artemisia cana/Poa nevadensis* p.a.
7. *P. nevadensis*, *P. juncifolia*, and *C. praegracilis* scarce 8

8. *Festuca idahoensis* or *Agropyron caninum* well represented (only common under grazing).....
   ..... *Artemisia cana/Festuca idahoensis* p.a.
8. *F. idahoensis* and *A. caninum* poorly represented.....
   ..... Undefined/unrecorded p.a./c.t. within *Artemisia cana* alliance

9. *Artemisia longiloba* well represented (other species of *Artemisia* may be present, even well represented..... 10
9. *A. longiloba* poorly repesented 12

10. *Festuca idahoensis* well represented (may be only common with intense grazing) .....
    ..... ***Artemisia longiloba/Festuca idahoensis* p.a.**
10. *F. idahoensis* poorly represented 11

11. *Agropyron dasystachyum* or *A. smithii*, individually or in combination, well represented ..... ***Artemisia longiloba/Agropyron dasystachyum* p.a.**
11. *A. dasystachyum* and *A. smithii* poorly represented, their single or combined cover ..... Undefined/unrecorded p.a./c.t. within *Artemisia longiloba* alliance

12. *Artemisia arbuscula* well represented (other species of *Artemisia* may be present, even well represented) .. 13
12. *A. arbuscula* poorly represented 15

13. *Festuca idahoensis* well represented (may be only common with grazing) ..... *Artemisia arbuscula/Festuca idahoensis* p.a.
13. *F. idahoensis* poorly represented (or scarce with grazing) 14

14. *Agropyron spicatum* well represented ..... *Artemisia arbuscula/Agropyron spicatum* p.a.
14. *A. spicatum* poorly represented ..... Undefined/unrecorded p.a./c.t.within *Artemisia arbuscula* alliance

15. *Artemisia tridentata* ssp. *tridentata* either singly, or its combined cover with *A. tridentata* ssp. *vaseyana*, well represented (other *Artemisia* taxa may be present) **and** *Sarcobatus vermiculatus* scarce (should *S. vermiculatus* be common then lead #72) .....
15. *A. tridentata* v. *tridentata* or its combined cover with *A. tridentata* ssp. *vaseyana* poorly represented and *S. vermiculatus* scarce 19

16. Rhizomatous wheatgrasses, principally *Agropyron dasystachyum* or *Pascopyrum smithii*, common ..... ***Artemisia tridentata v. tridentata/Pascopyrum smithii* p.a.**
16. *A. dasystachyum* and *Pascopyrum smithii* or other wheatgrasses scarce 17

17. *Festuca idhoensis* well represented (or common if grazing a factor) ..... ***Artemisia tridentata* v. *tridentata/Festuca idahoensis* p.a.**
17. *F. idahoensis* poorly represented 18

18. *Stipa comata* (or *S. spartea*) well represented (common if grazing intensive) ..... ***Artemisia tridentata v. tridentata/Stipa comata* p.a.**
18. *S. comata* and *S. spartea* poorly represented ..... Undefined/unrecorded p.a./c.t. within *Artemisia tridentata* v. *tridentata* alliance

19. *Artemisia tridentata* ssp. *vaseyana* well represented 20
19. *A. tridentata* ssp. *vaseyana* poorly represented 57

20. *Elymus cinereus* well represented (only common under intensive grazing regime) ..... ***Artemisia tridentata* ssp. *vaseyana/Elymus cinereus* p.a.**
20. *E. cinereus* poorly represented 21

21. *Festuca scabrella* common (scattered plants with intensive grazing) ..... *Artemisia tridentata* ssp. *vaseyana/Festuca scabrella* p.a.
21. *F. scabrella* scarce 22

22. *Festuca idahoensis* well represented (only common under grazing regime) ..... ***Artemisia tridentata* ssp. *vaseyana/Festuca idahoensis* p.a.**
22. *F. idahoensis* poorly represented 23

23. *Agropyron spicatum* common (reduce to present under grazing) ..... ***Artemisia tridentata* ssp. *vaseyana/Agropyron spicatum* p.a.**
23. *A. spicatum* scarce to absent ..... Undefined or unrecorded p.a./c.t. within *Artemisia tridentata* ssp. *vaseyana* alliance

24. *Artemisia nova* well represented (other *Artemisia* taxa may be present, even well represented) 25
24. *A. nova* poorly represented 26

25. *Agropyron spicatum* or *Oryzopsis hymenoides* common ..... ***Artemisia nova/Agropyron spicatum*** **p.a.**
25. *A. spicatum* and *O. hymenoides* scarce ..... Undefined/unrecorded p.a./c.t. within *Artemisia nova* alliance

26. *Cercocarpus ledifolius* well represented 27
26. *C. ledifolius* poorly represented (and by population structure not likely to incease)..... 29

27. *Festuca idahoensis* well represented (only commmon if intesively grazed).....
..... ***Cercocarpus ledifolius/Festuca idahoensis*** **p.a.**
27. *F. idahoensis* poorly represented (or scarce with grazing) 28

28. *Agropyron spicatum* or *Oryzopsis hymenoides*, singly or combined, the dominant graminoids .....
..... ***Cercocarpus ledifolius/Agropyron spicatum*** **p.a.**
28. *A. spicatum* and *O. hymenoides*, singly or combined cover, not the dominant graminoids.....
..... Undefined/unsampled p.a./c.t. within *Cercocarpus ledifolius* alliance

29. *Artemisia tridentata* ssp. *wyomingensis* well represented 30
29. *A. tridentata* ssp. *wyomingensis* poorly represented 32

30. *Agropyron dasystachyum* (or *Pascopyrum smithii*) common .....
..... ***Artemisia tridentata*** **ssp.** ***wyomingensis/Agropyron dasystachyum*** **p.a.**
30. *A. dasystachyum* and *P. smithii* scarce 31

31. *Agropyron spicatum* common ..... ***Artemisia tridentata*** **ssp.** ***wyomingensis/Agropyron spicatum*** **p.a.**
31. *A. spicatum* scarce ..... Undefined/unrecorded p.a./c.t. within *Artemisia tridentata* ssp. *wyomingensis* alliance

32. *Artemisia tripartita* the dominant shrub spp. (*Artemisia* spp). 33
32 *A. tripartita* not the dominant shrub spp..... 37

33. *Festuca idahoensis* well represented (only common with intensive grazing) .....
..... ***Artemisia tripartita/Festuca idahoensis*** **p.a.**
33. *F. idahoensis* poorly represented (except under grazing conditions) 34

34. *Agropyron dasystachyum* or *Pascopyrum smithii* common, graminoid dominants.....
..... ***Artemisia tripartita/Agropyron dasystachyum*** **p.a.**
34. *A. dasystachyum* or *P. smithii* scarce 35

35. *Agropyrum spicatum* common (present as scattered individuals with grazing).....
..... ***Artemisia tripartita/Agropyron spicatum*** **p.a.**
35. *A. spicatum* scarce 36

36. *Stipa comata* (or *S. spartea*) well represented ..... *Artemisia tripartita/Stipa comata* p.a.
36. *S. comata* or *S. spartea* poorly represented .. Undefined/unrecorded p.a./c.t. within *Artemisia tripartita* alliance

37. *Artemisia pedatifida* well represented (other *Artemisia* or shrubby spp may be present) 38
37. *A. pedatifida* poorly represented 39

38. *Festuca idahoensis* well represented or the dominant graminoid .. *Artemisia pedatifida/Festuca idahoensis* p.a.
38. *F. idahoensis* poorly represented or not the dominant graminoid .....
..... Undefined/unrecorded p.a./c.t.within *Artemisia pedatifida* alliance

39. *Rhus aromatica* well represented, as scattered patches, or the dominant shrub 40
39. *R. aromatica* poorly represented, not the dominant shrub 42

40. *Festuca idahoensis* well represented or dominant graminoid ..... *Rhus aromatica/Festuca idahoensis* p.a.
40. *F. idahoensis* poorly represented, not dominant graminoid 41

41. *Agropyron spicatum* common or dominant graminoid ..... *Rhus aromatica/Agropyron spicatum* p.a.
41. *A. spicatum* scarce or not the dominant graminoid .....
..... Undefined/unrecorded p.a./c.t. within the *Rhus aromatica* alliance

42. *Chrysothamnus viscidiflorus* the well represented or the dominant shrub 43
42. *C. viscidiflorus* poorly reprsesented or not the dominant shrub 44

43. *Stipa comata* common or the dominant herbaceous species .... ***Chrysothamnus viscidiflorus/Stipa comata*** **c.t.**
43. *S. comata* scarce, not the dominant herbaceous species .....
..... Underfined/unreported c.t. within *Chrysothamnus viscidiflorus* alliance

44. *Sarcobatus vermiculatus* well represented (valley locations with saline or alkaline soils) 45
44. *S. vermiculatus* poorly represented 48

45. *Distichlis stricta* well represented (usually alkali flats conditions prevail) .....
..... ***Sarcobatus vermiculatus/Distichlis stricta*** **c.t**
45. D. stricta poorly represented, habitat conditions various 46

46. *Elymus cinereus* common ..... *Sarcobatus vermiculatus/Elymus cinereus* p.a.
46. *E. cinereus* scarce, not the dominant graminoid 47

47. *Pascopyrum smithii* the dominant component of herbaceous vegetation .....
..... ***Sarcobatus vermiculatus/Pascopyrum smithii*** **c.t.**
47. *P. smithii* not the dominant herb ..... Undefined/unrecorded p.a./c.t. of the *Sarcobatus vermiculatus* alliance

48. *Atriplex gardneri* dominant shrub of saline of alkaline flats; *Oryzopsis hymenoides* common or the dominant herb ..... ***Atriplex gardneri/Oryzopsis hymenoides*** **c.t.**
48. *A. gardneri* not the dominant shrub ..... Underfined/unrecorded shrub type

KEY TO WETLAND/RIPARIAN SHRUB COMMUNITIES

(see Alpine Key for high subalpine or alpine habitats where dwarf or prostrate shrubs [mostly *Salix* spp.] are well represented)

1. *Salix* species with at least 10% canopy cover 2
1. *Salix* spp. having less than 10% canopy cover 20

2. *Salix geyeriana, S. boothii, S. drummondiana* or *S. lutea* with at least 10% canopy cover 3
2. Above listed willow species, individually or combined cover, less than 10% canopy cover 9

3. *Salix lutea* with greater canopy cover than *S. drummondiana* or combined cover of *S. geyeriana* and *S. boothii* 4
3. *S. lutea* having less canopy cover than *S. drummondiana* or combined cover of *S. geyeri* and *S. boothii* 5
4. *Calamagrostis canadensis, C. stricta* or *Deschampsia cespitosa*, individually or in combination, having at least 10% canopy cover ..... *Salix lutea/Calamagrostis canadensis* p.a.
4. *C. Canadensis, C. stricta* and *D. cespitosa* individual or combined cover <10% .....
..... Undefined/unreported *Salix lutea* alliance c.t./p.a.

5. *Salix drummondiana* with a greater canopy cover than the individual or combined cover of *S. boothii* and *S. geyeriana* ..... *Salix drummondiana* p.a.

20. *Salix exigua* with a greater canopy cover than any other *Salix* species ..... ***Salix exigua* c.t.**
20. *S. exigua* having less canopy cover than any other individual *Salix* species .....
..... Undefined/unclassified riparian-wetland site type

21. *Betula glandulosa* having ≥ 10% canopy cover 22
21. *B. glandulosa* with < 10 23

22. *Carex rostrata, C. atherodes, C. vesicaria* well represented ..... *Betula glandulosa/Carex* rostrata p.a.
22. *C. rostrata, C. atherodes, C. vesicaria* poorly represented Undefined/Unreported *B. glandulosa* alliance c.t./p.a.

23. *Kalmia microphylla* having ≥ 10% canopy cover 24
23. *K. microphylla* with < 10% canopy cover 25

24. *C arex scopulorum* or *C. nigricans* or their combined cover well represented .....
..... *Kalmia microphylla/Carex scopulorum* p.a.
24. *C. scopulorum* or *C. nigricans* or their combined cover poorly represented .....
..... Undefined *K. microphylla* alliance c.t/p.a.

25. *Betula occidentalis* having at least 10% canopy cover and with the greatest cover of the tallest layer.....
..... *Betula occidentalis* c.t.
25. *B. occidentalis* having < 10% canopy cover 26

26. *Alnus incana* (syn. *A. tenuifolia*) with 10% canopy cover and with greatest canopy cover in tallest layer.....
..... *Alnus incana* c.t.
26. *A. incana* having < 10% or not having the greatest canopy cover of the tallest layer 27

27. *Potentilla fruticosa* having ≥ 10% canopy cover 28
27. *P. fruticosa* having < 10% canopy cover 29

28. *Deschampsia cespitosa* or *Juncus balticus* well represented; under intensive grazing *D. cespitosa* may be only common; *Carex* spp. typical of wetter regimes (*C. rostrata* and ecological analogues, *C. simulata, C. nebraskensis, Carex praegracilis*) poorly represented ..... *Potentilla fruticosa/Deschampsia cespitosa* p.a.
28. *D. cespitosa* or *J. balticus* poorly represented ..... Undefined/unreported *P. fruticosa* alliance c.t./p.a.

29. *Artemisia cana* well represented 30
29. *A. cana* poorly represented 31

30. *Festuca idahoensis* well represented; other graminoids indicative of more abundant moisture (e.g. *Deschampsia cespitosa, Juncus balticus, Carex rostrata* & analogues, *C. similata, C. praegracilis*) scarce or confined to microsites ..... *Artemisia cana/Festuca idahoensis* p.a.
30. *F. idahoensis* poorly represented ..... Undefined/unreported *A. cana* alliance c.t/p.a.

31. *Sarcobatus vermiculatus* well represented or if vegetation depauperate then the shrub layer dominant; *S. vermiculatus* often not shrub layer dominant (expect *Artemisia* or *Chrysothamnus* spp.) 32
31. *S. vermiculatus* poorly represented or, if depauperate conditions obtain, then not the shrub layer dominant.. 35

32. *Distichlis stricta* well represented (alkali flats conditions prevail) .....
..... ***Sarcobatus vermiculatus/Distichlis stricta* p.a.**
32. *D. stricta* poorly represented 33

33. *Elymus cinereus* well represent (only common under intensive grazing) .....
..... *Sarcobatus vermiculatus/Elymus cinereus* p.a.
33. *E. cinereus* poorly represented 33

5. *S. drummondiana* with less cover than the combined or individual cover of *S. boothii* and *S. geyeriana* 6

6. *Carex rostrata, C. vesicaria, C. atherodes, C. aquatilis* or *C. lenticularis*, individual or combined cover, at least 10% ..... *Salix geyeriana/Carex rostrata* p.a.
6. All of the above-listed *Carex* spp. with individual or combined cover < 10% 7

7. *Calamagrostis canadensis, C. stricta* or *Deschampsia cespitosa* well represented (>5% canopy cover); if grazed intensively *D. cespitosa* only common (>1%) ..... *Salix geyeriana/Calamagrostis canadensis* p.a.
7. *C. canadensis, C. stricta* and *D. cespitosa* poorly represented (<5% canopy cover) 8

8. Considered singly or in any combination, the following species often associated with disturbance, dominate the herbaceous layer: *Poa pratensis, P. palustris, Phleum pratense, Agrostis stolonifera,* or *Juncus balticus* ..... *Salix geyeriana/Poa pratensis* c.t.
8. None of the above-listed species, singly or in any combination dominate the herbaceous layer. ..... Undefined/unreported *Salix geyeriana* alliance c.t./p.a.

9. *Salix planifolia* or *S. commutata*, their individual or combined cover, is ≥ 10% 10
9. *S. planifolia* or *S. commutata*, their individual or combined cover, is <10% 12

10. *Carex aquatilis* well represented ..... *Salix planifolia/Carex aquatilis* p.a.
10. *C. aquatilis* poorly represented 11

11. *Carex nebraskensis* or *C. simulata* well represented ..... ***Salix planifolia/Carex nebraskensis* c.t.**
11. *C. nebraskensis* and *C. simulata* poorly represented ..... Undefined/unreported *Salix planifolia* or *S. commutata* alliance c.t/p.a.

12. *Salix candida* having at least 10% canopy cover 13
12. *S. candida* having less than 10% canopy cover 14

13. *Carex rostrata* well represented (≥ 5%) ..... *Salix candida/Carex rostrata* p.a.
13. *C. rostrata* poorly represented (< 5%) ..... Undefined/unreported *Salix candida* alliance c.t./p.a.

14. *Salix wolfii* having at least 10% canopy cover 15
14. *S. wolfii* with less than 10% canopy cover 17

15. *Carex rostrata, C. atherodes, C. vesicaria, C. lenticularis* and *C. aquatilis*, condidered as single species or in any combination, well represented ..... *Salix wolfii/Carex rostrata* p.a.
15. Any of the above-listed species, considered singly or in any combination, poorly represented 16

16. *Deschampsia cespitosa* or *Juncus balticus* or their combined cover well represented; accept *D. cespitosa* at common level where grazing is intensive ..... *Salix wolfii/Deschampsia cespitosa* p.a.
16. *D. cespitosa* or *J. balticus* or their combined cover poorly represented ..... Undefined/unreported *Salix wolfii* alliance p.a./c.t.

17. Individual non-*Salix* (non-willow) species having a greater canopy cover than any individual *Salix* species. . 18
17. Individual *Salix* species with greater canopy than any individual non-*Salix* species. 21

18. *Salix lasiandra* with greater canopy cover than any other individual *Salix* species ..... *Salix lasiandra* c.t.
18. *S. lasiandra* with less canopy cover than any other individual *Salix* species. 19

19. *Salix bebbiana* with greater canopy cover than any other *Salix* species ..... *Salix bebbiana* c.t.
19. *S. bebbiana* having less canopy cover than any other *Salix* species 19

34. *Agropyron smithii (syn. Pascopyrum smithii)* or *A. dasystachyum* (syn. *Elymus lanceolatus*) the dominant component of herbaceous layer ..... ***Sarcobatus vermiculatus/Agropyron smithii*** **p.a.**
34. *A. smithii* and *A. dasystachyum* not the dominant undergrowth component ..... Undescribed/unrecorded *Sarcobatus vermiculatus* p.a./c.t.

35. *Symphoricarpos occidentalis* or *S. albus*, their individual or combined cover ≥ 15% ..... *Symphoricarpos occidentalis* c.t.
35. *S. occidentalis* and S. albus or their combined cover < 15% .... Undefined/unreported riparian-wetland c.t./p.a.

KEY TO HERB-DOMINATED UPLAND AND WETLAND/RIPARIAN COMMUNITIES BEGINS HERE

1. Sites ranging from moist upland to seasonally saturated flats to jurisdictional wetlands; dominated by any one of the following species, *Juncus balticus*, *Deschampsia cespitosa*, *Carex praegracilis*, *Muhlenbergia richardsonis*, *Hordeum jubatum*, *Elymus cinereus*, *Pascopyrum smithii*, *Puccinellia* spp. 2
1. Sites drier than described above or occurring at highest elevations of subalpine zone (above distribution of *Pseudotsuga menziesii* as climax species, upper distribution of *Artemisia tridentata* ssp. *vaseyana*) upward into alpine and, with the exceception of *D. cespitosa* in the sub-alpine/alpine, not supporting any of the above listed species as dominants 11

2. *Deschampsia cespitosa* well represented (only common if grazing intensive) 3
2. *D. cespitosa* poorly represented 4

3. *Potentilla diversifolia* common or *Phleum alpinum* and *Trisetum spicatum* present; high subalpine to alpine meadows ..... *Deschampsia cespitosa/Potentilla* diversifolia p.a.
3. *P. diversifolia* scarce, *P. alpinum* and *T. spicatum* absent; habitats various ..... ***Deschampsia cespitosa c.t.***

4. *Juncus balticus*, *Carex praegracilis*, or *Muhlenbergia richardsonis*, singly or combined coverage, well represented or dominant undergrowth species 5
4. *J. balticus*, *C. praegracilis*, and *M. richardsonis* poorly represented, singly or in the aggregate 6

5. *Juncus balticus* virtually the only spp. present, characteristically of drawdown zones of lemnic environments... ..... ***Juncus balticus*** **p.a.**
5. *Carex praegracilis* or *Muhlenbergia richardsonis* common ..... ***Juncus balticus-Carex praegracilis*** **p.a.**

6. *Elymus cinereus* well represented (only common under intense spring grazing pressure) or *Puccinellia distans* or *Poa juncifolia* well represented or dominant ..... ***Elymus cinereus-Puccinellia distans*** **c.t.**
6. *E. cinereus, Puccinellia distans, and P. juncifolia* poorly represented (scarce under grazing pressure) 7

7. *Puccinellia distans* (or other *Puccinellia* spp.) common or dominant; alkaline seeps or flats 8
7. *P. distans* (or other *Puccinellia* spp.) scarce, not dominant herb 9

8. *Poa juncifolia* common, ... *Puccinellia distans-Poa juncifolia* p.a.
8. *P. juncifolia* scarce ..... Undefined *Puccinellia* spp. p.a./c.t.

9. *Eleocharis palustris* or *Hordeum jubatum* dominant graminoids or well represented, singly or combined cover... ..... ***Eleocharis palustris-Hordeum jubatum*** **c.t.**
9. *E. palustris* and *H. jubatum* not the dominant graminoids and not well represented 10

10. *Agropyron smithii* dominant graminoid or well represented ..... ***Agropyron smithii/Alluvial flat*** **p.a.**
10. *A. smithii* not the dominant graminoid, poorly represented .... Undefined/unreported graminoid-dominated c.t.

11. Communities of high subalpine to alpine sites, generally above 8,500 ft., or if occurring lower then associated with windswept shoulders and ridges ..... See Alpine Key following wetland/riparian section
11. Not as above, communities of elevations generally considered to lie below the upper subalpine, roughly less than 8,500 ft. at this latitude and climatic regime 12

12. *Festuca scabrella* well represented (only common under intensive grazing) 13
12. *F. scabrella* poorly represented (or scarce under grazing) 15

13. *Festuca idahoensis* well represented, *Agrpyron spicatum*, if present, with less cover than *F. idahoenis* ..... *Festuca scabrella-Festuca idahoensis* p.a.
13. *F. idahoensis* poorly represented, A. spicatum common or at least equal in cover to *F. idahoensis* 14

14. *Agropyron spicatum* common (may be reduced to scattered indiviuals under intensive grazing)..... ..... *Festuca scabrella-Agropyron spicatum* p.a.
14. *A. spicatum* scarce ..... Undefined/unreported p.a./c.t. within *Festuca scabrella* alliance

15. *Festuca idahoensis* well represented or *Deschampsia cespitosa* common (or only common or present, respectively, under intensive grazing) 16
15. *F. idahoensis* poorly represented (or scarce under intensive grazing); *D. cespitosa* absent 22

16. *Deschampia cespitosa* present, usually accompanied by *Phleum alpinum* and *Trisetum* spp. ..... *Deshampsia cespitosa/Potentilla diversifolia* p.a. [*F. idahoensis-D. cespitosa* of Mueggler and Stewart (1980)]
16. *D. cespitosa* absent 17

17. *Potentilla diversifolia*, *Carex scirpoidea*, *C. filifolia* or *Phleum alpinum* common; sites at higher reaches of subalpine extending to alpine, extending lower on cold, exposed sites ..... *Festuca idahoensis/Potentilla diverisifolia* (includes two Mueggler & Stewart (1980) types, *F. idahoensis-Carex scirpoidea* p.a. (hypothesized) and *F. idahoensis-Carex filifolia* p.a. (verified))

17. *P. diversifolia*, *C. scirpoidea*, *C. filifolia*, *P. alpinum* scarce; sites not of alpine to high subalpine, or not exposed or colder than prevailing climate 18

18. *Stipa richardsonii* well represented ..... *Festuca idahoensis-Stipa richardsonii* p.a.
18. *S. richardsonii* poorly represented 19

19. *Geranium viscossisimum*, *Potentilla gracilis* present and/or *Bromus carinatus* or *Agropyron caninum* common ..... ***Festuca idahoensis-Agropyron caninum*** **p.a.**
19. Not as above 20

20. *Pascopyrum smithii* and/or *Agropyron dasystachyum* common ... *Festuca idahoensis/Pascopyrum smithii* p.a.
20. *P. smithii* and *A. dasystachyum* scarce 21

21. *Agropyron spicatum* common (accept presence under intensive grazing regime)..... ..... ***Festuca idahoensis-Agropyron spicatum*** **p.a.**
21. *A. spicatum* scarce ..... Undefined/unreported p.a./c.t. within *Festuca idahoensis* alliance

22. *Agropyron smithii* or *Agropyron dasystachyum* common and *A. spicatum* poorly represented 23
22. *P. smithii* and *A. dasystachyum* scarce except in stands where *A. spicatum* well represented 25

23. *A. smithii* a nearly monospecific dominant of gentle flats and bottom with fine-textured soils..... ..... ***Agropyron smithii*** **p.a.**
23. *A. smithii* not virtually the only species of importance, sites including more than fine-textured bottomlans .. 24

24. *Agropyron dasystachyum* common and usually dominant componet of early seral stages on sandy substrates ...

. . . . . ***Agropyron dasystachyum/Phacelia hastata* c.t.**

24. *A. dasystachyum* scarce and/or not dominant . . . . . Undefined c.t./p.a. within *P. smithii and A. dasystachyum* alliances

25. *Agropyron spicatum* well represented (only common under intensive grazing, or where badland conditions or high degrees of exposed substrate, usually gravel, obtain) 26
25. *A. spicatum* poorly represented (or scarce with grazing) . . . . .

26. Rhizomatous wheatgrasses, principally *Agropyron dasystachyum* and *Pascopyrum smithii* common, *Carex stenophylla* usually present . . . . . ***Agropyron spicatum-Pascopyrum smithii* p.a.**
26. Rhizomatous wheatgrasses scarce; *C. stenophylla* usually absent 27

27. *Bouteloua gracilis* well represented . . . . . *Agropyron spicatum-Bouteloua gracilis* p.a.
27. *B. gracilis* poorly represented 28

28. *Oryzopsis hymenoides* present; sites either badlands with naturally (mostly) eroded conditions or excessively drained sandy soils . . . . . ***Agropyron spicatum-Oryzopsis hymenoides* p.a.**
28. Not as above 29

29. Ridge shoulders or convexities exposed to prevailing winds (usually with soil deflation and much, 60%+, exposed substrate); at or below the upper subalpine zone; cushion plants (e.g *Eritrichium nanum, Douglasia montana, Townsendia* spp.) or compact forbs (e.g. *Oxytropis campestris, Haplopappus acaulis*) dominate the undergrowth; graminoid component far reduced relative to forbs . . . . . ***Agropyron spicatum*/Cushion Plants p.a.**
29. Not as above 30

30. *Poa sandbergii* present, usually graminoid 2nd in importance to *A. spicatum*; *Stipa comata* or *S. spartea* may be conspicuous components on lower alluvial slopes and benches and valley bottoms . . . . . ***Agropyron spicatum-Poa sandbergii* p.a.**
30. Not as above . . . . . Undefined/unreported p.a./c.t within *Agropyron spicatum* alliance

31. *Stipa comata* (or *S. spartea*) and/or *Bouteloua gracilis* the dominant graminoids 32
31. Neither *S. comata* (*S. spartea*) nor *B. gracilis* the dominant graminoids 33

32. *Psoralea tenuiflora* present, usually dominant forb in depauperate vegetation; substrate sandy . . . . . ***Stipa comata/Psoralea tenuiflora* c.t.**
32. *Psoralea tenuiflora* absent . . . . . ***Stipa comata-Bouteloua gracilis* c.t.**

33. *Distichlis stricta* common, usually the dominant graminoid in salt-or alkali-affected sites. . *Distichlis stricta* p.a.
33. *D. stricta* poorly represented, may not be the dominant graminoid. . . . . Undefined/unreported herbaceous p.a./c.t. for southwestern MT

KEY TO WETLAND/RIPARIAN HERB-DOMINATED COMMUNITIES

(see Alpine Key for high subalpine or alpine habitats where herbs are dominant)

1. *Carex* spp. dominant, cover usually exceeding 15% 2
1. *Carex* spp. not dominant and their cover generally less than 15% 9

2. *Carex rostrata* (syn. *C. utriculata*), *C. atherodes*, or *C. vesicaria*, singly or combined with 15% cover or dominant, having the greatest cover of any herb . . . . . ***Carex rostrata* p.a.**
2. *C. rostrata, C. atherodes*, and *C. vesicaria* singly or any combination thereof having less than 15% cover and not dominant 3

3. *Carex lenticularis* or *C. aquatilis* or their combined cover at least 15%, or the dominant forbs (having greater canopy cover than any other species) ..... *Carex aquatilis* p.a.
3. *C. lenticularis* and *C. aquatilis* having less than 15% canopy cover, singly or combined and not the dominant forbs 4

4. *Carex limosa* having at least 15% canopy cover ..... *Carex limosa* p.a.
4. *C. limosa* with less than 15% canopy cover 5

5. *Carex lasiocarpa, C. lanuginosa,* or *C. buxbaumii,* considered individually or in any combination, with ≥ 15% canopy cover ..... *Carex lasiocarpa* p.a.
5. *C. lasiocarpa, C. lanuginosa,* and *C. buxbaumii,* considered individually or in any combination, have < 15% canopy cover 6

6. *Carex simulata* with ≥ 15% canopy cover ..... *Carex simulata* p.a.
6. *C. simulata* having < 15% canopy cover 7

7. *Carex scopulorum* the dominant graminoid ..... *Carex scopulorum* alliance
7. *C. scopulorum* not the dominant graminoid 8

8. *Carex nebraskensis* well represented (≥ 5% canopy cover) ..... *Carex nebraskensis* p.a.
8. *C. nebraskensis* poorly represented (< 5% canopy cover) .... Unclassified/unreported wetland-riparian c.t./p.a.

9. *Typha latifolia* or *T. angustifolia,* or their combined cover, ≥ 25% or dominant cover ..... *Typha latifolia* p.a.
9. *T. latifolia* and *T. angustifolia* and their combined cover < 25% and not dominant in canopy 10

10. *Scirpus acutus* or *S. validus,* or their combined cover, ≥ 15% or the dominant cover ..... *Scirpus acutus* p.a.
10. *S. acutus* and *S. validus* and ther combined cover < 15% and not the dominant cover 11

11. *Phalaris arundinacea* having ≥ 25% canopy cover or is the dominant species ..... *Phalaris arundinacea* c.t.
11. *P. arundinacea* with < 25% canopy cover and not the dominant species 12

12. *Equisetum fluviatile* having ≥ 15% canopy cover or dominant herb ..... *Equisetum fluviatile* p.a.
12. *E. fluviatile* with < 15% canopy cover and not the dominant herb 13

13. *Glyceria borealis* with ≥ 15% canopy cover or the dominant herb ..... *Glyceria borealis* p.a.
13. *G. borealis* with < 15% canopy and not the dominant herb 14

14. *Eleocharis palustris* or *E. acicularis* or their combined cover ≥ 15% ..... *Eleocharis palustris* p.a.
14. *E. palustris* and *E. acicularis* and their combined cover < 15% 15

15. *Eleocharis pauciflora* with ≥ 15% canopy cover ..... *Eleocharis pauciflora* p.a.
15. *E. pauciflora* having < 15% canopy cover 16

16. *Calamagrostis canadensis, C. neglecta* or *C. stricta* (syn. *C. neglecta*) or their combined cover ≥ 15% ..... *Calamagrostis canadensis* p.a.
16. *C. canadensis, C. neglecta* and *C. stricta* and their combined cover < 15% 17

17. *Deschampsia cespitosa* well represented (≥ 5%) or only common (≥1%) with intensive grazing ..... *Deschampsia cespitosa* p.a.
17. *D. cespitosa* poorly represented, or scarce with moderate-intense grazing 18

18. *Juncus balticus* with greater canopy cover than other herbaceous species 19

18. Other herbaceous species with greater cover than *J. balticus* 20

19. *Juncus balticus* virtually the only species present, characteristically of draswdown zones of limnic environments ..... *Juncus balticus* p.a.
19. *Carex praegracilis* or *Muhlenbergia richardsonis* or their combined coverage well represented ..... *Juncus balticus-Carex praegracilis* p.a.

20. *Distichlis spicata* having≥ 15% canopy cover ..... *Distichlis spicata* p.a.
20. *D. spicata* with < 15% canopy cover 21

21. *Elymus cinereus* (syn. *Leymus cinereus*) well represented (≥ 5%) 22
21. *E. cinereus* poorly represented 23

22. *Puccinellia distans* well represented (≥ 5%) or dominant graminoid after *E. cinereus* ..... *Elymus cinereus-Puccinellia distans* c.t.
22. *P. distans* poorly repressented ..... Unclassified/unreported *Elymus cinereus* alliance c.t./p.a.

23. *Agropyron smithii* (syn. *Pascopyrum smithii*) or *A. dasystachyum* or their combined cover ≥ 15% or the dominant herbs ..... *Agropyron smithii*/Alluvial flat
23. *A. smithii* and *A. dasystachyum* and their combined cover < 15% and not the dominant herbs 24

24. *Poa palustris* with greater canopy cover than any other herbaceous spp. ..... *Poa palustris* c.t.
24. Other herbaceous species with greater canopy cover than *P. palustris* 25

25. *Poa pratensis* with greater canopy cover than any other herbaceous spp. ..... *Poa pratensis* c.t.
25. Other herbaceous spp. with greater canopy cover than *P. pratensis* ..... Unclassified/unreported wetland-riparian herb-dominated type

KEY to HIGH SUBALPINE (nonforested) and ALPINE COMMUNITIES of SOUTHWESTERN MONTANA: (COMMUNITY TYPES from CONTIGUOUS PORTIONS of WYOMING and IDAHO INCLUDED for COMPLETENESS)

Caveats and Conventions:

1. This key is generally structured to identify, within lifeform groups, the wettest sites first and progresses to successively drier sites (habitats).
2. Alpine vegetation, due to extremes of climate, is in a constant state of flux, more so than that of lower elevation environments. Therefore the recognized classificatory units are community types (c.t., plural c.ts.), implying no particular seral status. We consider all identified c.ts. to be stable for time frames relevant to land management considerations. The existence of climax or longterm stable alpine communities is widely disputed (Hanson and Churchill). Certainly at the largest scales (within stands of particular c.ts.)there is continual disturbance due to both physical (e.g. congeliturbation) and biological factors (pocket gophers, *Thomomys talpoides*).
3. Keep in mind, when reading key leads, that breaks and information presented are based on sample data and observations; without question there exist sites and vegetation which are not consonant with this classification. To increase the key's applicability we have incorportated leads that key to c.ts. of adjacent regions; c.ts. that may well occur in our study area. These types have been marked with a superscipted number indicating the source, 1. Thelenius and Smith (1985), 2. Various studies from east-central Idaho, 3. Hansen et al. (1991).
4. Homogeneity of environment and vegetation are primary considerations in plot selection. The plot being classified should be representative of the stand as a whole; if not, then relocate plot and re-estimate coverages.
    a. Note that environmental gradients are often steep in the alpine and the size of relatively homogeneous vegetation types may be extremely small (< 10 m^2). One can identify c.ts., but they could only be mapped as components of complex mosaic.
    b. Homogeneity is most easily appraised as an area supporting a particular suite of dominant species and then examining the subordinate species for idicator significance.

5. The dichotomous key is only a convenience for identifying community types; **it is not the classification!** Validate your determination of c.t. by comparing plot vegetation/site characteristics with parameters of c.t. descriptions.

KEY TO COMMUNITY TYPES (see instructions above before proceeding)

1. Communities with shrubs dominant or having shrubby aspect, though shrub canopy coverage may not exceed 5% 2
1. Shrubs poorly represented (<5% c.c.), widely scattered individuals 11

2. Shrub communities of wetland areas with any of the following *Salix* (*S. arctica, S. reticulata, S. planifolia, S. glauca*) dominating the shrub layer; *Salix* spp. generally abundant, though occasionally only well represented . 3
2. Shrub communities lacking attributes of wetlands (regarding soils, hydrology or floristic composition); *S. reticulata, S. arctica,* or *S. planifolia* absent or confined to microsites 5

3. *Salix planifolia* dominating the shrub layer with *Carex scopulorum* well represented and usually dominant, though *Deschampsia cespitosa* also achieves this status ..... *Salix planifolia/Carex scopulorum* c.t.[3]
3. *S. planifolia* not the shrub layer dominant 4

4. *Salix reticulata* the dominant shrub with *Caltha leptosepala* present to abundant but not necessarily dominating the diverse herbaceous layer ..... *Salix reticulata/Caltha leptosepala* c.t.
4. *Salix arctica* the dominant shrub with *Polygonum bistortoides* well represented in the herbaceous layer ..... *Salix arctica/Polygonum bistortoides* c.t.

5. *Salix glauca* dominating the shrub layer, undergrowth variable ..... *Salix glauca* c.t.
5. Shrub layer dominant not *S. glauca* 6

6. *Salix* spp., other than *S. glauca*, dominant ..... UNDEFINED *Salix* SPP. C.T.
6. Shrub species other than *Salix* dominating canopy 7

7. Environments with late-persisting snowpack (snowbed communities) or stands on moderate to steep, predominantly north-facing slopes 8
7. Environments lacking late-persisting snowpack and not occupying steep, predominantly north-facing slopes; not snowbed communities 9

8. *Phyllodoce empetriformis* or *P. glandulifera* dominating the shrub layer with canopy cover ranging upward from abundant; *Antennaria lanata* diagnostic of herbaceous layer with coverages highly variable ..... *Phyllococe empetriformis/Antennaria landata* c.t.
8. Not as above, *Cassiope mertensiana* dominating the shrub layer; *Carex paysonis* present as graminoid diagnostic species ..... *Cassiope mertensiana/Carex paysonis* c.t.

9. Sites with *Dryas octopetala* as the shrub-layer dominant 10
9. *D. octopetala* not the shrub-layer dominant ..... UNDEFINED SHRUB TYPE

10. Relatively mesic sites of protected slopes giving the impression of nearly total vegetation coverage (turf sites) with *Dryas octopetala* abundant and *Salix reticulata* well represented but not abundant; *Polygonum viviparum, P. bistortoides, Zigadenus elegans* and *Oxytropis viscida* are diagnostic in forb layer; graminoids are poorly represented ..... *Dryas octopetala/Polygonum viviparum* c.t.

10. Sparsely vegetated sites of exposed positions (ridge tops, shoulders, saddles, etc.) with *Dryas octopetala* in

distinct clumps of highly variable coverage, usually surrounded by bare ground or rock; common forb layer components include *Phlox pulvinata*, *Oxytropis campestris*, *Arenaria obtusiloba* and *Douglasia montana*; *Carex*

rupestris and *C. elynoides* dominate the sparse graminoid layer ..... *Dryas octopetala/Carex rupestris* c.t.

11. Stands dominated by graminoids (grasses, sedges, rushes etc.). 12
11. Stands dominated not by graminoids, but rather by forbs 24

12. Wetland sites with floristic composition and/or soils/hydrology meeting wetland criteria 13
12. Sites not wetlands, not meeting wetland criteria 14

13. Wetland sites dominated by *Carex scopulorum* and/or *C. lenticularis* and *Caltha leptosepala* or *Senecio cymbalarioides*, singly or combined, well represented and diagnostic forbs ..... *Carex scopulorum/Caltha leptosepala* c.t.
13. Wetland sites with *Carex scopulorum* and *C. lenticularis* poorly represented ..... UNDEFINED GRAMINOID-DOMINATED WETLAND TYPE(S)

14. Snowbed communities (sites with greater accumulations of snow than other landscape positions and/or later meltoff of snow) 15
14. Not snowbed sites, not characterized by above average snow deposition or late meltoff 18

15. Sites where snow is very long-persisting (longer than any other vegetated position) and *Carex nigricans* is dominant and usually abundant ..... *Carex nigricans* c.t.
15. *C. nigricans* scarce, not the canopy dominant 16

16. Snowbed sites often with depauperate herb cover; with *Juncus drummondii*, *Antennaria lanata* and/or *Sibbaldia procumbens* present and dominant ..... *Juncus drummondana/Antennaria lanata* c.t.
16. Snowbed sites, but not as above 17

17. *Juncus parryi* the dominant graminoid with *Erigeron ursinus* the dominant forb, though only common, cover not exceeding 5% ..... *Juncus parryi/Erigeron ursinus* c.t.
17. *J. parryii* not the dominant graminoid and *E. ursinus* not dominant forb ..... UNDEFINED SNOWBED C.TS.

18. Stands dominated by one, or combinations, of the following six graminoids *Deschampsia cespitosa*, *Festuca idahoensis*, *Hesperochloa kingii*, *Bromus pumpellianus*, *Juncus balticus* or *Carex obtusata* 19
18. Stands not dominated by any one, or combination, of the above listed graminoid species 25

19. Graminoid component dominated by *Deschampsia cespitosa*, moist to wet meadows 20
19. Graminoid component not dominated by *D. cespitosa* 22

20. *Caltha leptosepala* and/or *Senecio cymbalalrioides* dominate forb layer of wet meadows ..... *Deschampsia cespitosa/Caltha leptosepala* c.t.
20. Forbs other than *C.leptosepala* or *S. cymbalarioides* dominant 21

21. *Potentilla diversifolia* common in the forb layer ..... *Deschampsia cespitosa/Potentilla diversifolia* c.t.
21. *P. diversifolia* scarce ..... UNDEFINED DESCHAMPSIA-DOMINATED C.T.

22. Graminoid component dominated by *Festuca idahoensis*, *Carex obtusata* or *Bromus pumpellianus* or any combination of the three .....

. . . . . ***Festuca idahoensis/Potentilla diversifolia* c.t.**

22. Neither *F. idahoensis* nor *C. obtusata* or *B. pumpellianus* or any combination of the three dominating the graminoid compontent 23

23. *Hesperochloa kingii* the graminoid with greatest coverage in rather depauperate communities 24
23. *H. kingii* not the indicated dominant . . . . . UNDEFINED GRAMINOID-DOMINATED C.TS.[2]

24. *Oxytropis campestris* present and characteristic forb . . . . . *Hesperochloa kingii/Oxytropis campestris* c.t.
24. *O. campestris* not present, not diagnostic . . . . . *Hesperochloa kingii* c.t. [2]

25. Turf communities (commonly characterized by an abundance of dwarf, fibrous-rooted graminoids, usually *Carex* spp., but forbs may dominate some stands); dominant graminoids with individual or combined cover exceeding 15% including *Carex elynoides, C. rupestris, C. scirpoidea, C. phaeocephala, C. albonigra, C. atrata* and *Festuca ovina* 26
25. Not graminoid-dominated or having reduced total (<50%) canopy coverage turf communities as decribed above 29

26. Moist turf sites with one or some combination of following *Carex* spp. dominant; *C. scirpoidea, C. phaeocephala, C. albonigra, C.atrata* 27
26. Dry turf sites (grading to cushion plant environments with much more open structrure) with one or some combination of the following species dominant; *Carex rupestris, C. elynoides, Festuca ovina* . . . . . a & b
    a. Turf nearly continuous with forbs a minor component . . . . . *Carex elynoides* c.t.
    b. Turf spotty, *C. rupestris* dominant graminoid with openings forb dominated and much exposed gravel/rock substrate . . . . . ***Carex rupestris/Potentilla ovina* c.t.**

27. *Geum rossii* common (usually well represented and the dominant forb); substrates non-calcareous . . . . . *Carex scirpoidea/Geum rossii* c.t.
27. *Geum rossii* scarce, other forbs dominant 28

28. *Potentilla diversifolia* and/or *Phlox pulvinata* dominant and common . . . . . *Carex scirpoidea/Potentilla diversi folia* c.t.
28. Not as above, *P. diversifolia* and *P. pulvinata* not dominant and scarce . . . . . UNDEFINED TURF C.TS.

29. Forb dominated turf communities ranging from dense generally continuous plant cover to somewhat open plant cover characterized by well-distributed clumps of erect forbs, though cushion plants may be dominant 30
29. More like cushion plant than turf communities, with erect forbs sparse and cushion plants dominant and/or much exposed substrate 34

30. *Geum rossii* as erect forb, dominant or co-dominant 29
30. *G. rossii* present, not dominant, cespitose and reduced in size 32

31. Erect forb *Trifolium parryi* dominant or co-dominant in forb layer . . . . . .*Geum rossii-Trifolium parryi* c.t.[1]
31. *T. parryi* absent or not dominant/co-dominant 32

32. Cushion plant *Trifolium nanum* dominant/co-dominant in forb layer . . . . . *Geum rossii-Trifolium nanum* c.t.[1]
32. *T. nanum* not dominant/co-dominant 33

33. Cushion plant *Trifolium dasyphyllum* dominant/co-dominant . . . . . *Trifolium dasyphyllum-Geum rossii* c.t.[1]

33. *T. dasyphyllum* not dominant/co-dominant ..... UNDEFINED TURF C.TS.

34. Fellfield (high degree of exposed rock) or cushion plant environments (exposed, wind-blasted positions, usually ridge crests, slope shoulders and saddles); cushion plants range from a dominant aspect of community to slightly subordinate to erect forbs 35

34. Sites not fellfields nor cushion plant communities, rather they include steep, either dry or wet slopes with a high degree of exposed substrate (>70%) 39

35. Cushion plant communities wherein *Geum rossii* and/or *Arenaria obtusiloba* are common or dominants of the forb layer (which is often depauperate with scattered plants ..... *Geum rossii-Arenaria obtusiloba* c.t.
35. Neither *G. rossii* nor *A. obtusiloba* common nor forb layer dominants 36

36. Moderately dense, single tier plant cover of prostrate and cespitose forbs, graminoid component depauperate, with *Phlox pulvinata* and *Trifolium dasyphyllum* providing more c.c.than other forbs ..... *Phlox pulvinata-Trifolium dasyphyllum* c.t.[1]
36. Not as above, neither *P. pulvinata* nor *T. dasyphyllum* the most important cushion plants 37

37. Scattered mixture of erect and cushion plants and graminoids with *Antennaria microphylla* and/or *Artemisia scopulorum* most important forbs ..... *Antennaria microphylla-Artemisia scopulorum* c.t.[1]
37. Cushion plant communities with neither *A. microphylla* nor *A. scopulorum* nor combinations of the two dominate the forb layer 38

38. Cushion plants dominant aspect of communities with varying combinations of the three species *Phlox multiflora, Trifolium nanum* and *Eritrichium nanum* providing majority of c.c ..... *Phlox multiflora-Triflorum nanum* c.t.[1]
38. None of the above three species providing the dominant aspect of vegetation cover ..... UNDEFINED CUSHION PLANT TYPE(S)

39. Sites with predominantly northerly exposures, moderate to steep slopes with a high degree (at least 75%) of exposed substrate of which more than 80% is soil or gravel; soils moist to saturated throughout growing season: vegetative canopy cover is much reduced, not exceeding 40% but with no characteristic species assemblage ... . MOIST SLOPE COMMUNITIES
39. Sites not as above 40

40. Sites with uniformly steep (>40%), often unstable slopes of southeast through west-facing exposures; of the large amount of exposed substrate (>55%) about 50% is gravel; Agropyron scribneri is usually the one species with higher coverage and constancy in this "type" than other c.ts ..... DRY SLOPE COMMUNITIES
40. Sites not as described above ..... UNDEFINED COMMUNITY TYPE(S)

Description of Classification Units

Abies lasiocarpa/Thalictrum occidentale p.a.
(ABILAS/THAOCC: subalpine fir/western meadowrue)

Environment- ABILAS/THAOCC is a common plant association in northwestern Wyoming and extends at least as far as the north-facing flank of the Centennial Range in Montana; it has not been documented from areas farther north. It occures on cool, moist slopes of all degrees of inclination and primarily on north- to east-facing aspects. The sampled elevation range was 7,400 to 8,200 ft., but in reconnaissance was noted to occur as low as 7,100 and as high as 8,400 ft. ABILAS/THAOCC grades to ABILAS/ARNCOR or /CALRUB on warmer, drier exposures.

Vegetation- The sampled stands in the Centennial Range were primarily of late-seral to old-growth conditions with long-lived (300+ years) *Pseudotsuga menziesii*, or occassionally *Pinus contorta*, dominating the upper canopy and *A. lasiocarpa* and *Picea engelmannii* at least common, usually abundant as understory pole and sapling-sized components. At the highest elevations of this type *Pinus albicaulis* can be an important seral component; the importance of P. contorta also appears to increase with increasing elevation. Based on age of breast-height cores it appears extensive stand-replacing fires occurred 182+ and 248+ years ago. Fire-scarred individuals were not found within stands, only on ridgelines where stem density is less and fuel-loading is light.

Undergrowth cover is strongly dependent upon tree canopy cover; open stands have a nearly continuous forb cover and closed, generally younger stands have scattered forbs totalling less than 5% cover. *Thalictrum occidentale*, *Osmorhiza chilensis* (?) or *Arnica cordifolia* are dominant, but the two foregoing spp. must be at least well-represented (common in closed canopy stands) to be diagnostic for the type. Other forbs with relatively high constancy are *Aquilegia flavescens*, *Aster engelmannii* and *Erythronium grandiflorum*. *Calamagrostis rubescens*, *Poa pratensis* and *Carex geyeri* are the only graminoids with even moderate constancy and virtually never attain the sward-like cover typical of othe associations. Total shrub cover seldom exceeds 5% but *Lonicera utahensis*, *Symphoricarpos oreophilus* and *Shepherdia canadensis* are present with at least 50% constancy.

Soils- Tertiary extrusive volcanics, predominantly rhyolite, dominate much of the north flank of the Centennial Range and all of the sample plots were located on this substrate which has weathered to deep, well-drained substrates. This type has also been noted on sedimentary substrates, primarily sandstones. We suspect calcareous substrates are effectively drier and support primarily ABILAS/ARNCOR or ABILAS/JUNCOM.

Other Studies- This type was first described for northwestern Wyoming and eastern Idaho by Steele et al.(1983) and a portion of the plots of Pfister et al. (1977) may also better fit the description of this type than that of ABILAS/ARNCOR, where they were grouped. Cole (1982) has described a very similar type for the Blue Mountains of northwestern Or egon.

Comments- Cattle grazing in this type has led, where canopy cover is reduced, to the introduction of locally dense patches of *Poa pratensis* and trampling of native vegetation; where surfaces remain moist into mid- to late-summer, soil compaction and hummocking are evident.

Natural Heritage Program Rank- G4/S3

Abies lasiocarpa/Calamagrostis rubescens p.a.
(ABILAS/CALRUB; subalpine fir/pine grass)

Environment- ABILAS/CALRUB is common on the south-facing flank of the Centennial Range but on the north-facing Montana portion it is a less prevalent type from 6,600 to at least 8,800 ft. on warm exposures. It usually grades to ABILAS/ARNCOR or /THAOCC on cooler exposures and exits in complex mosaics with ABILAS/CARGEY that occasion the question as to what factors may differentiate these types.

Vegetation- Description of this type comes from mid-seral stands which have a mixed canopy dominance split between *Pseudotsuga menziesii* and *Pinus contorta. Abies lasiocarpa* and Picea engelmannii are slow to reestablish on these dry sites. *Pinus albicaulis* occurs scattered at the highest elevations of this type.

The undergrowth is typically dominated in younger open stands by a near sward of *Calamagrostis rubescens*, usually accompanied by *Carex geyeri*, and the forbs, *Thalictrum occidentalis*, *Fragaria virginiana*, *Aster conspicuus* and *Arnica cordifolia* are characteristically present though poorly represented, excepting *A. cordifolia.* In older stands or those are the "closed canopy" stage *C. rubescens* may be reduced to scattered patches or even poorly represented. In open seral conditions *Shepherdia canadensis* and *Juniperus communis* may be well represented.

Soils- Very limited data preclude saying much about this type other than to observe that it occurred on rhyolite substrates in the Centennial Range north flank but also is known from sedimentary substrates on the south flank.

Other Studies- ABILAS/CALRUB is a common type from central Montana (Pfister et al.1977), where it occurs on calcareous substrates, to nothern Utah (Mauk & Henderson 1984) and central Colorado (Karmokova et al. 1988). It occurs as far west as the eastern flank of the Cascades in Washington and Oregon (Williams and Smith 1990, Williams and Lillybridge1985) and is prevalent in Oregeon's Blue Mountains (Johnson & Simon 1987).

Natural Heritage Program Rank- G5/S4

Abies lasiocarpa/Carex geyeri p.a.
(ABILAS/CARGEY; subalpine fir/elk sedge)

Environment- The ABILAS/CARGEY p.a. is a minor type throughout the Centennial Range but gain greater prominance in the Greater Yellowstone, encompassing some of the driest sites within the ABILAS series. Sampled sites ranged from 7,600 to 8,600 ft., but the lower portion of this range could be extended considerably based on reconnaissance observations. Slopes of all degrees of inclination are included and aspects range from primarily east- through south- to west-facing. This type often grades to PSEMEN/CARGEY or /CALRUB on yet drier (lower elevation) sites and to ABILAS/THAOCC or /ARNCOR on moister exposures.

Vegetation- Sampled stands were both late mature early seral and thus encompassed much variablilty in structure and compostion. The lower elevation examples of this type are dominated throughtout their existence by *Pseudotsuga menziesii* with *Abies lasiocarpa* and *Picea engelmannii* only slowly establishing. Long-lived *Pinus contorta* may also form nearly pure stands on this type, but the usual condition is to occur mixed with *Pseudotsuga.* Stands from higher elevations often have *A. lasiocarpa* establishing immediately following disturbance but *P. menziesii* is still a major component. P*inus albicaulis* (or *P. flexilis*) can also be a major long-lived seral component.

Because we recognize forb-rich conditions as conveying a higher moisture status and belonging to preferentially recognized plant associations, the undergrowth conditions in ABILAS/CARGEY are mostly typified by the dominance of *Carex geyeri* with only scattered forbs. In open stands *C. geyeri* may approach a sword-like coverage. Forbs commonly present include *Thalictrum occidentale*, *Astragalus miser*, *Fragaria virginiana*, *Aster foliaceus* and *Arnica cordifolia.* In early- to mid-seral conditions *Shepherdia canadensis* and *Juniperus communis* are usually well represented.

Soils- Very limited information for this type indicated it occurrs preferentially on non-calcareous substrates which agrees with type descriptions from other areas. We found it exclusively on rhyolites or various forms of extrusive igneous in the Centennial Range and others (Steele et al. 1983, Steele et al. 1981, Alexander et al. 1986) also report it from volcanic substrates that weather to other than fine-textured substrates. Only in central MT has it been reported from calcareous substrates (Pfister et al. 1977).

Other Studies- ABILAS/CARGEY is recorded as minor type in central Montana ranges (Pfister et al. 1977), as a major type within the granitics of central Idaho's Batholith and occurs as a minor type as far south as northwestern

Colorado (Hoffman and Alexander 1980) and Utah. Across its range it appears associated with volcanics of various kinds, both extrusive and intrusive.

Natural Heritage Program Rank- G5/S4

Abies lasiocarpa/Arnica cordifolia p.a.
(ABILAS/ARNCOR; subalpine fir/heartleaf arnica)

Environment- This is a major community type in the drier mountain ranges of Montana east of the Continental Divide, especially on calcareous substrates, ranging on into northwestern Wyoming. It is a common type within the Centennial Range, distributed on sites drier than those supporting ABILAS/THAOCC and occurring at generally higher elevations, usually transitional to the moister/colder ABILAS/VACSCO p.a. Though more prevalent on northerly exposures, it is found on all aspects and degrees of slope steepness. The observed elevation range was 7,300 to 8,900 ft., but the actual range is no doubt broader.

Vegetation- Limited data and reconnaissance observations indicate *Pinus contorta* and *Pseudotsuga menziesii* and all admixtures dominate seral stages and persist to near climax conditions. *Abies lasiocarpa* and *Picea engelmannii* are generally slow to reestablish following disturbance. Waist high 50 year old *Abies* specimens are not unusual. *Pinus albicaulis* is scattered to abundant in the highest elevation examples of this type.

Undergrowth is generally somewhat depauperate depending on degree of canopy closure, but even young stands may have less than 5% cover. *Arnica cordifolia* is the diagnostic forb (by default); others commonly occurring are *Pyrola secunda, Aster conspicuus,* and *Osmorhiza chilensis* or *O. depauperata.* In early seral stands *Shepherdia canadensis, Juniperus communis* or *Symphoricarpos oreophilus* are often well represented but decline to scattered individuals as the tree canopy closes.

Soils- The only instances of this type on study area BLM holdings were found on Tertiary volcanics, principally rhyolite. In the near vicinity, on the south-facing flank of the Centennials, there are instances of this type occurring on sed imentary substrates, including calcareous ones.

Other Studies- This is a common type east of the Continental Divide in Montana and its areal extent increases with the increase in calcaeous substrates. In central Idaho (Steele et al. 1981) it is a common type on quartzite and mixed volcanics which is also the case in northwestern Wyoming (Steele et al. 1983). ABILAS/ARNCOR is purported to occur as far south as Colorado.

Natural Heritage Program Rank- G5/S5

Abies lasiocarpa/Ribes montigenum p.a.
(ABILAS/RIBMON; subalpine fir/mountain gooseberry)

Environment- ABILAS/RIBMON is found within the upper subalpine zone, generally beyond the limits of *Pseudotsuga,* and well within an environment wherein *Pinus albicaulis* is an important seral component We noted this type as low as 7,500 ft on steep, north-facing slopes and extending to upper treeline (circa 8,600 ft.) on the Centennial's Big Table Mountain; Pfister et al (1977) noted this type extending to 9,000 ft in the higher portion of the Centennials. At upper elevations of its distribution ABILAS/RIBMON occurred on all aspects but seemed to be associated with slopes having late snow release. This type generally grades to ABILAS/ARNCOR and /CARGEY at lower elevations and to ABILAS/VACSCO on more moist sites, but in the inventoried BLM portion of the Centennial Range ABILAS/VACSCO was not encountered, indicating this portion of the range may be quite dry. At highest elevations groves of ABILAS/RIBMON (on north slopes or depressions) form a mosaic with *Artemisia tridentata* var. *vaseyana* -dominated shrublands or *Festuca idahoensis*-dominated grasslands.

Vegetation- Only older, decadent stands were sampled and from their structure it appeared that the early seral tree species are *Pinus albicaulis* and *Abies lasiocarpa* and to a much lesser degree *Picea engelmannii* and even *Pseudotsuga menziesii* (though ideally these sites are above the cold limits of Pseudotsuga). With stand break-up (heavy mortality in *P. albicaulis* and *A. lasiocarpa* at 150 to 200 years, or older) a second flush of *A. lasiocarpa* and *P. engelmannii* is established. As remarked by Pfister et al. (1977) these sites are apparently unfavorable for *Pinus contorta.*

Stands with closed canopies are quite depauperate, but with canopy openings *Ribes montigenum* is common to well represented, usually in openings that appear to receive greater snow deposition than the majority of the stand. Forbs with a consistent presence include *Pyrola secunda, Aquilegia flavescens,* and *Arnica cordifolia.* The higher elevations of BLM Centennial holdings are used as sheep range which may account for the greater than expected cover of *Poa pratensis* and lesser amounts of forbs.

Soils- All sampled stands occurred on Tertiary volcanics which weather into nutrient-poor, acidic medium-textured soils. The ground surface had less than 10% exposed rock or soil and more than 80% litter.

Other Studies- This type was originally described from Utah by Pfister (1972) and documented for southcentral and southwestern Montana by Pfister et al. (1977) and adjacent Challis and Open Northern Rockies Sections by Steele et al. (1981). It is sporadically distributed across western Wyoming and here evidences some departure from the type, e.g. the importance of seral P. contorta, as described above for southwestern MT. The eastern extremity of distribution is Colorado (Langenheim 1962) and to the south, southern Utah (Youndblood and Mauk 1985).

Natural Heritage Program Rank- G5/S5

Picea/Equisetum arvense p.a.
(PICEA/EQUARV; spruce/common horsetail)

Environment- PICEA/EQUARV is the major wetland type within the Picea series present throughout the Intermountain West, though little appropriately wet habitat is present in southwestern MT to support this p.a.; patch size usually does not exceed a few tenths of an acre. PICEA/EQUARV generally occurs on flat sites such as subirrigated terraces, seeps, fen margins and toeslopes that receive sufficient subsurface flow to be continuously saturated, or nearly so. Standing water may be present well into summer.

Vegetation- Stands are characteristically dominated by mature, not infrequently old-growth size *Picea*, with a low density of often severely suppressed specimens in the understory. Scattered *Abies lasiocarpa* and *Pinus contorta* are often present on raised microsites (windthrow hummocks) and may be generally distributed on drier sites within the type, but these species never create a dominant aspect.

The wettest or youngest examples of this type have *Salix* spp. (often *S. bebbiana*) present but more typically *Cornus stolonifera, Ribes lacustre* and *Symphoricarpos albus* are the only shrubs present. Diagnostic for this type is abundant *Equisetum arvense*; lesser coverages may be present, especially on sites with a thick carpet of bryophytes. A tally of other obligate or facultative hydrophytes, e.g. *Streptopus amplexifolius, Parnassia fimbriata, Senecio triangularis, Geum macrophyllum* and *Calamagrostis canadensis* (or *C. neglecta*) should confirm the hydrophytic nature of these sites.

Soils- The only sampled site was developed on fine-textured alluvium and given the landscape position of other sites noted in reconnaissance various textures of alluvium would be expected. Generally a thick mat of mor humus is expected (up to 18 cm thick): for the sampled site humus was only 8 cm thick.but the upper soil horizons are also rich with organics.

Other Studies- This association, or the very similar *P. engelmannii*/EQUARV, have been documented from the east slope of the Cascades in Washington (Williams & Lillybridge 1983, Williams and Lillybridge 1990) and Oregon

(Kovalchik 1987) east to Montana (Pfister et al. 1977, Hansen et al. 1991) and south through Wyoming (Steele et al. 1983) to Idaho (Steele et al. 1981), Utah (Padgett et al. 1989) and Colorado (Cooper and Cottrell 1990).

Comments- This association is particularly susceptible to livestock/wildlife trampling throughout the growing season; resulting damages include exposed substrate and conseqeut erosion, loss of vegetation and introducton of weeds.

Natural Heritage Program Rank- G4/S4

Picea engelmannii/Galium triflorum p.a.
(PICEA/GALTRI; Engelmann spruce/sweetscented bedstraw)

Environment- PICEA/GALTRI is usually associated with benches and terraces bordering riparian reaches, seep areas and moist toeslopes, from the lowest forested elevations to the mid subalpine zone. In southwestern MT the observed range was from 7,400 to 8,400 ft., considerably extending the range cited (2,800-7,050 ft.) by the Montana Riparian/Wetland Association (Hansen et al. 1991). In the vicinity of the drier Tendoy Range PICEA/GALTRI has a wide elevational range but in the Centennial Range it occurs only at lower treeline and just upslope giving way at higher elevations (with comparable environments) to ABILAS/*Actaea rubra*; in other words this type is present only beyond the geographical or ecological limits of *Abies lasiocarpa*. In our study area PICEA/GALTRI has very limited acreage as it was noted in reconnaissance to occur only as a narrow stringer in toeslope positions or on very narrow streamside terraces. These sites are considered to receive greater than average moisture due to subsurface flow, but most sites probably would not be considered jurisdictional wetlands.

Vegetation- We have followed the naming convention of Pfister et al. (1977) and pertetuated by Hansen et al. (1991) by referring to *Picea* at the genus level recognizing that most of the Montana populations are hybrid swarms of *P. glauca* x *P. engelmannii*. Cursory observations of cone size, scale morphology and length of the free scale indicated that *P. engelmannii* characters were predominant. In the portions of this p.a. with higher moisture status *Picea* generally dominates a closed mature canopy and other age classes are poorly represented. *Pseudotsuga menziesii* and *Pinus contorta* are important seral species on the drier portion of this habitat.

Undergrowth coverage is highly variable but generally the diagnostic species *Galium triflorum, Actaea rubra* and *Streptopus amplexifolius* are only present, seldom even common and only approach well represented. Other moist-site species with moderate constancy are *Heracleum lanatum, Smilacina stellata, Mertensia ciliata, Geum macrophyllum* and on disturbed sites (by cattle) *Urtica dioica. Thalictrum occidentale, Osmorhiza chilensis* and *Taraxacum officinale* (on disturbed sites) often are well represented. *Ribes lacustre, Symphoricarpos albus* and *Rubus parviflorus* are the only shurbs consistently present, though only *S. albus* is ever well represented. Some sites support a nearly continuous layer of bryophytes, but others have only a solid layer of litter.

Soils- Alluvial and colluvial deposits are the predominant substrates, derived from the country rock and generally silty in texture.

Other Studies- PICEA/GALTRI was first described by Pfister et al. (1977) as occurring from central MT southward, reaching its greatest abundance in the Gallatin Nat. Forest vicinity. It is also common in northwestern Wyoming (Steele et al. 19843) and central Idaho (Steele et al. 1981) , recognized here by the same suite of indicator species, though apparently pure *P. engelmannii* populations dominate these extra-MT sites.

Comments- This type is especially susceptible to livestock trampling damage early in the growing season when soils are saturated; damages include vegetation destruction and severe hummocking and wee introduction.

Natural Heritage Program Rank- G4/S4

Picea/Senecio streptanthifolius p.a.
(PICEA/SENSTR; spruce/Rocky Mountain butterweed)

Environment- This is the driest of Picea series types identified for Montana. Within the study area, as is true regarding its overall distribution, it occurrs only on calcareous substrates; thus it is areally extensive only in the Tendoy Range, where it was sampled and noted in reconnaissance. The Tendoy Range is also in a rainshadow further exacerbatng site severity. Its elevation range was from 7,600 to 8,800 ft with generally cool aspects and steeper slopes predominating. Sites are often have considerable exposed soil, gravel and rock with litter not much exceeding 40%; alternatively, some sites have bryophyte coverage exceeding 40%. Adjacent sites with yet drier regimes are within the Pseudotsuga menziesii or Pinus flexilis series or occasionally an open Festuca idahoensis- or Artemisia tridentata v. tridentata-dominated complex; moister sites occupy restricted environments within this mountain range.

Vegetation- Seral tree dominants on this association are *Pseudotsuga menziesii* and *Pinus flexilis* and here they are slow-growing. *Picea* is slow to establish on these droughty sites and is equally slow growing. Severity of site is also reflected in canopy structure which usually does not exceed 80% and often is around 40-50%, especially where natural mortality has removed canopy dominants.

The undergrowth is generally low in coverage, not exceeding 30% even when canopy structure is quite open. Composition can be quite diverse with many of the consistently present species drawn from the adjacent grasslands, such as *Potentilla diversifolia, Townsendia montana, Astragalus miser, Synthyris pinnatifida, Antennaria microphylla, Solidago multiradiata* and *Frasera speciosa.* None of the undergrowth species assert dominance in terms of cover, even the diagnostic *Senecio streptanthifolius*. Only *Arnica cordifolia* was noted to be well represented. On steep north-facing slopes bryophyte cover may be substantial, exceeding 20%.

Soils- As noted above all examples of this type occurred on calcareous substrates, usually limestone. Limestones weather to a silty texture but these soils have much exposed gravel and rock, in combination usually exceeding 20%.

Other Studies- This type was first identified by Pfister et al. (1977) for Montana. It has not been recognized elsewhere, though the portion of *Picea engelmanni/Arnica cordifolia,* which occurs on calcareous substrates in the Absaroka and Owl Creek Ranges of northwestern Wyoming and supports *S. streptanthifolius* is virtually identical.

Natural Heritage Program Rank- G4/S4

Pseudotsuga menziesii/Scree p.a.
(PSEMEN/SCREE; Douglas-fir/scree)

Environment- PSEMEN/Scree is a widespread plant association in Montana previously recognized by the simple designation of "Scree" without dominant overstory identified. This association is distinguished by its unique substrate, unstable, generally steep slopes; potentially this type can be found on slopes of any aspect or angle of repose providing they are unstable, but as sampled and noted it occurs on those with any aspect but greater than 50% slope. All sampled conditions and the most extensive stands (on quartzite) were in Granite Co. but this type was noted for the Tendoy and Centennial Ranges as limited linear patches on substrates of various origin. The sampled elevation range was 4,400 to 5,400 ft. but it has been noted over a much wider range; potentially it is coextensive with the distribution of Pseudotsuga.

Vegetation- Due to existing severe site conditions trees are usually widely spaced and slow growitn with a wolfy form; combined canopy cover ranged from 20 to 70%, dominated by *Pseudotsuga menziesii* but with *Juniperus scopulorum* and *Pinus ponderosa* well repsesented on lower elevation sites. The combination of ustable substrates, low undergrowth productivity and widely spaced trees has resulted in a high proportion of these stands developing into old-growth, with *Pseudotsuga* 2-3 ft. in diameter.

The undergrowth is depauperate, in both diversity and cover, in the graminoid and forb components with only *Agropyron spicatum*, Heuchera parviflora and *Phacelia hastata* having high constancy. Shurbs take advantage of their deep rooting habit to become by far, the undergrowth component with the greatest coverage (and highest diversity); *Acer glabrum* consistently dominated this layer with *Ribes cereum*, *Amelanchier alnifolia*, and *Symphoricarpos oreophilus* (*S. albus* to the northwest of area) consistently present, occasionally well represented.

Soils- The unstable nature of these substrates is their distinguishing character; parent material includes calcareous and non-calcareous sedimentary as well as crystalline materials. The combined exposure of soil, gravel and rock usually exceeds 50% and runs as high as 90% with litter the only other important component. Usually even the litter and bryophyte components are underlain by coarse fragments. Soil development is minimal with no horizonization evident.

Other Studies- For Montana and Idaho this type was first described under the broader designation "Scree" (Pfister et al. 1977, Cooper et al. 1987) but this syntaxon included enormous variation as it included all tree series. PSEMEN/Scree has been formally described only for southern Colorado and northern New Mexico (DeVelice et al. 1986, Fitzhugh et al. 1987) largely because other regional forest classifications (e.g. Steele et al. 1983, Youngblood and Mauk 1985) have been biased toward commercial forests, which PSEMEN/Scree is clearly not. Using a key based on vegetation alone these sites would key to PSEMEN/*Acer glabrum* (Steele et al. 1983) which is a very different, highly productive association of central and northern Idaho.

Natural Heritage Program Rank- G5/S4

Pseudotsuga menziesii/Physocarpus malvaceus **plant association**
(PSEMEN/PHYMAL; Douglas-fir/ninebark)

Environment- PSEMEN/PHYMAL is a common forest type of the Garnet Resource Area but is a minor type within the Dillon R.A., recorded only in field notes and sampled once by Pfister et al. (1977). It is found primarily on steep, northwest-, through north-, to east-facing slopes, verging on the unstable, often with a bryophyte/lichen encrusted rocky limestone substrate; occasionally found to extend continuously from toe-slopes or drainage bottoms up to slope shoulders. Most of this type is found below 6,000 ft., the documented occurrences being below 4,600 ft. It was noted to grade to PSEMEN/Scree of steeper, rockier positions and PSEMEN/*Symphoricarpos oreophilus* (or *S. albus*) or PSEMEN/*Calamagrostis rubescens* on warmer exposures.

Vegetation- *Pseudotsuga menziesii* dominates the mostly closed canopy from seral through old-growth stages with *Pinus ponderosa* and *Juniperus scopulorum* consistently represented, their cover generally not exceeding 20%. *P. ponderosa* persists into the old-growth stage reproducing where canopy gaps are sufficiently large.

The undergrowth is dominated by shrubs, with *Physocarpus malvaceus* and *Acer glabrum* usually abundant and *Symphoricarpos albus*, *Spiraea betulifolia*, *Clematis occidentalis* and *Berberis repens* consistently common to well repressented. *Calamagrostis rubescens* is the only graminoid with high constancy, but in southwestern MT lacks the high coverages that distinguish a phase of this association. *Smilacina stellata* and *Aster conspicuus* have high constancy and are often abundant; *Heuchera parviflora* and *Disporum trachycarpum* are consistently present but poorly represented.

Soils- All examples of PSEMEN/PHYMAL in southwestern Montana were noted for calcareous substrates (this is not true throughtout its much broader geographic range). In degree of development, rock and gravel content and depth soils are highly variable; some steep north-facing sites verge on being scree sites but an intact, nearly continuous bryophyte layer indicates little movement (such habitat conditions also obtain in eastern Washington and northern Idaho).

Other Studies- PSEMEN/PHYMAL is one of the plant associations recognized in the Daubenmire's (1968) pioneering work of forest classification in eastern Washington and northern Idaho. Now this plant association (or

regional permutations thereof) is recognized from as far west as interior British Columbia (Braumandl and Curran 1992) and Okanogan (Williams and Lillybridge 1983) to as far south as northern Utah (Mauk and Henderson 1984).

Comments- Being broadly distributed, there is much floristic diversity within this type. It also manifests the phenomena of factor compensation in a remarkable fashion; in the moist climatic regime of northern Idaho its found only on warmer exposures, south-facing slopes and in the much drier regimes of central and southwestern Montana on steep northerly exposures.

Natural Heritage Program Rank- G5/S5

Pseudotsuga menziesii/Calamagrostis rubescens p.a.
(PSEMEN/CALRUB; Douglas-fir/pine grass)

Environment- PSEMEN/CALRUB is an uncommon type on BLM holdings, documented only from the Madison Co. vicinity on relatively warm, moist slopes at 5,900 ft upward to ridge crests. This type was not found in the Tendoy Range and noted only as fragments in the Centennial Range and vicinity but reasons for its absence were not apparent.

Vegetation- The tree canopy is usually closed and dominated by *Pseudotsuga menziesii*; *Pinus flexilis* and *Juniperus scopulorum* may be well represented but usually they are just scattered individuals. These sites are accessible and generally support only second-growth stands.

Depending on canopy density and other factors the undergrowth can range from a luxuriant sward of *Calamagrostis rubescens* and *Carex geyeri* with associated forbs to depauperate conditions where *C. rubescens* occurs in thin patches and forbs are scarce. Forbs with high frequency and occasionally well represented include *Arnica cordifolia*, *Antennaria racemosa*, *Aster conspicuus*, and *Galium boreale.*

Soils- This type has been documented from both granitic and calcareous substrates with sandy and silty loams. There is little exposed soil or gravel/rock; most ground cover is contributed by litter and bryophytes.

Other Studies- PSEMEN/CALRUB is such a common and broadly distritbuted plant association in Montana that four phases have been recognized reflecting different geographical influences and ecological conditions. Likewise for Idaho (Steele et al. 1981), Wyoming (Steele et al. 1983), Washington (Daubenmire and Daubenmire 1968) on into southern Utah (Mauk and Henderson 1984) geographical and ecological distinctions have been recognized at the phase level of the association.

Natural Heritage Program Rank- G5/S5

Pseudotsuga menziesii/Symphoricarpos oreophilus p.a.
(PSEMEN/SYMORE; Douglas-fir/mountain snowberry)

Environment- PSEME/SYMORE occupies cooler exposures, moderate to steep slopes with northwest- through southeast-facing aspects. The sampled range was 6,200 to 8,050 ft. but the upper elevational limits are expected to be somewhat greater; it often was noted to extend continuously from midslopes to near ridge shoulders. This type is generally set in a landscape where drier exposures are *Artemisia tridentata* or *Festuca idahoensis*-dominated rangelands though there may be a narrow bordering fringe of open *Pseudotsuga*- or *Pinus flexilis*-dominated forest with bunchgrass undergrowth.

Vegetation- *Pseudotsuga menziesii* dominates a closed tree stratum wherein *Pinus flexilis* and *Juniperus*

scopulorum are consistently present, usually not exceeding 20% cover. All the stands we sampled had been entered at some time in the past for clearcutting or salvage logging. Abundant skeletons of *Artemisia tridentata* in younger stands indicate a seral stage probably dominated by this and other rangeland species.

Undergrowth tends to be depauperate in number of species and coverage with no set pattern of dominance; we noted shrubs or graminoids or forbs could be dominant. *Symphoricarpos* is 100 % constant but seldom even well represented; other highly constant shrubs include *Ribes cereum* and *Juniperus communis*. *Festuca occidentalis* and *Poa pratensis* and *P. nervosa* are consistently present, sometimes well represented. *Arnica cordifolia*, *Solidago mutiradiata*, *Astragalus miser* and *Phlox multiflora* have a high constancy and are occasionally well represented. Bryophyte and lichen cover varies widely from 30% plus to virtually nill, the variabiliy ostensibly based on time since the last disturbance.

Soils- This p.a. was found only on calcareous substrates that weather to silt loams or loams. Surfaces have less than 5% exposed gravel, rock and soil (combined); they are covered with litter or bryophytes/lichens.

Other Studies- PSEMEN/SYMORE is very broadly distributed, ranging from east of the Cascades to northeastern Washington (Williams and Lillybridge 1983, 1985) and south to Blue Mountains of Oregon (Johnson and Simon 1987); it experiences a large gap in distribution in northern Idaho and western Montana but then in the expansive calcareous substrates of southwestern Montana it resurges in importance and maintains this status through central Idaho (Steele et al. 1981), western Wyoming (Steele et al. 1985) and Colorado (Johnson 1987) to southern Utah (Youngblood and Mauk 1985) and northern New Mexico (Muldavin 1994). It is found on other than calcareous substrates in regions outside southwestern Montana.

Natural Heritage Program Rank- G5/S3

***Pseudotsuga menziesii/Arnica cordifolia* p.a.**
(PSEMEN/ARNCOR; Douglas-fir/heartleaf arnica)

Environment- PSEMEN/ARNCOR occupies the cooles-driest exposures supporting the *Pseudotsuga* series in southwestern Montana, moderate to steep slopes with north- through east-facing aspects. The sampled range was 6,200 to 8,050 ft. but the upper elevational limits are expected to be somewhat greater. PSEMEN/ARNCOR is often noted to extend continuously from slope bottoms, just above toeslopes, to near ridge shoulders or to grade to PSEMEN/SYMORE of upslope positions. This type is generally set in a landscape where drier exposures are *Artemisia tridentata* or *Festuca idahoensis*-dominated rangelands though there may be a narrow bordering fringe of open *Pseudotsuga*- or *Pinus flexilis*-dominated forest with bunchgrass undergrowth.

Vegetation- Forest canopy cover is generally greater than 60-70%, dominated by *Pseudotsuga menziesii* with minor amounts, usually less than 10% canopy cover, of *Pinus flexilis* and *Juniperus scopulorum*. Scattered, stunted individuals (termed "accidentals") of *Abies lasiocarpa* or *Picea* indicate a transition to the moister-cooler environments characterized by these species in late successional stages.

Undergrowths are normally depauperate, especially in stands approaching late-seral to old-growth status.The shrub component is very sparse with only *Ribes viscossisimum* and *Symphoricarpos oreophilus* consistently represented. Artemisia tridentata skeletons are present in younger stands indicating these sites may pass through a seral stage dominated by this species and other rangeland components. *Poa nervosa* appears to be the most constant of graminoids but is not well represented. Forb diversity is moderately diverse with the diagnostic *Arnica cordifolia* generally well represented to abundant and *Antennaria racemosa*, *Geranium viscossisimum*, *Astragalus miser*, *Potentilla gracilis* having high constancy. Bryophyte and lichen combined cover generally exceeds 30% and runs as high as 90% plus.

Soils- All sampled stands occurred on calcareous (limestone) substrates, but this type was noted on volcanics in the course of reconnaissance. These materials weather to loams to silt loams and have little (<10%) exposed rock,

gravel or soil.

Comments- Sampled stands had all been entered either for clearcutting or salvage; pressure on these stands to provide timber and fuel for the mining industry was very intense in the latter decades of 1800's and opening decades of 1900's.l

Other Studies- PSEMEN/ARNCOR has been identified on a variety of parent materials for central and southwestern Montana (Pfister et al. 1977) where it is considered too dry to support *Calamagrostis rubescens* or *Carex geyeri* (and their comparably named *Pseudotsuga menziesii* series plant associations). This type extends to northwestern Wyoming (Steele et al. 1983) and east-central Idaho (Steele et al. 1981) where two phases are recognized.

Natural Heritage Program Rank- G4/S4

Pseudotsuga menziesii/Cercocarpus ledifolius p.a.
(PSEMEN/CERLED; Douglas-fir/curlleaf mountain mahogany)

Environment- PSEMEN/CERLED is restricted to dry, often steep (>40%) upper slopes and ridges with south- to west-facing aspects. Sites mostly have shallow soils and much (>30%) exposed substrate that often approaches scee in lack of stability. Sampled elevation range was 5,800 to 6,600 ft, though its noted range included higher elevations. PSEMEN/Symphoricarpos oreophilus occurs on relatively more more mesic, or less rocky sites and CERLED/AGRSPI is also part of what is often a fairly fine-scaled mosaic of forest/tall shrub communities.

Vegetation- Canopy structure is usually quite open, savannalike with total combined cover of *Psuedotsuga menziesii* and *Juniperus scopulorum*, the only tree species present, not exceeding 50% and often as little as 5%. *Pinus flexilis* was not recorded where substrates are crystalline (Silverbow Co.) but was noted in reconnaissance of calcareous substrates (Beaverhead Co.).

Shrub cover, the two principal ones of which are *Cercocarpus ledifolius* and *Artemisia tridentata*, is at least as variable as the tree cover but seldom exceeds 50%. *Artemisia frigida* and *Chrysothamnus nauseosus* have high constancy and scarce coverage. The herb component is poorly represented and only *Agropyron spicatum, Poa sandbergii* and *Lappula redowski* have greater than 50% constancy. Combined bryophyte and lichen cover ranged as high as 40%, but usually they are merely traces.

Soils- All sampled stands occurred on coarse-textured soils derived from granitic parent materials and had as much as 90% exposed gravel and rock; deep percolation of precipitation subsequently tappable by trees and shrubs is the factor assumed to favor these lifeforms on these sites.

Other Studies- DeVelice and Lesica (1993) have described PSEMEN/CERLED for the Pryor Mountains and vicinity. It extends from the study area into east-central Idaho (Steele et al.1981) and southeastern Idaho and southwestern Wyoming (Steele et al. 1983), where it is found on a variety of substrates, and is documented as far south as southern Utah (Youngblood and Mauk 1985).

Natural Heritage Program Rank- G4/S3

Psuedotsuga menziesii/Festuca idahoensis p.a.
(PSEMEN/FESIDA; Douglas-fir/Idaho fescue)

Environment- PSEMEN/FESIDA is a dry site type but was found on all aspects depending on the local precipitation patterns; in rainshadow positions it is found on north-facing aspects whereas in main mountain masses it is associated with steep, west- to south-facing slopes. The observed elevation range was 6,600 to 7,800 ft., but

there is no reason it could not be found both these extremes. It grades to PSEMEN/*Agropyron spicatum* or *Artemisia tridentata* var. *vaseyana*- or *Festuca idahoensis*-dominated rangelands on drier aspects or more densely forested *Pseudotsuga*-dominated community types of moister exposures.

Vegetation- *Pseudotsuga menziesii* dominates the canopy and all size classes including reproduction, whereas *Pinus flexilis* and *Juniperus scopulorum* are reduced to minor components (cover < 10%) of the canopy and reproduce only in larger canopy gaps. Stands with warmer exposures tend to be more open (< 60 % cover) than those of cooler northerly slopes (approaching 90% canopy cover).

Artemisia tridentata var. *vaseyana* and *Chrysothamnus viscidiflorus* are present as scattered individuals and many skeletons of *A. tridentata* may be present in younger stands indicating this type passes through an *A. tridentata*-dominated seral stage. Herbaceous components are those of the adjacent grasslands, but with reduced cover. *Festuca idahoensis* is the dominant graminoid except were grazing pressure is intensive, then *Poa sandbergii*, *Koeleria cristata* or *Hesperochloa kingii* (only in the southwestern extreme) become dominant. *Astragalus miser* and *Antennaria microphylla* are common, occasionally abundant , forbs. Lichen and bryophyte cover varies widely, but apparently is related to stand age (or history) being higher in older, more dense ones..

Soils- Parent materials include both crystalline and calcareous substrates and generally there is less than 20% exposed substrate, most of which is soil. The relatively high content of woody debris is mostly from sagebrush skeletons or mortality of old wolf trees.

Other Studies- The PSEMEN/FESIDA p.a. has a broad geographic distribution, from east of the Cascades in Washington (William and Lillybridge 1983) and British Columbia (McLean 1970) to northwesern Colorado (Bourgeron and Engelking 1994), but has its greatest areal extent along the Rocky Mountain Front and scattered ranges of central Montana (Pfister et al. 1977).

Natural Heritage Program Rank- G5/S4

Pinus flexilis/Cercocarpus ledifolius p.a.
(PINFLE/CERLED; limber pine/curlleaf mountain mahogany)

Environment- PINFLE/CERLED has been sampled only in the Limestone Hills vicinity, in the proximity of the Elkhorn Range but has been noted in reconnaissance in the Tendoy Range vicinity. In both areas PINFLE/CERLED is associated with moderate to steep slopes with west- to south-facing aspects and calcareous substrates. In the Tendoys it occurs as a narrow fringe, rather ecotonal, between the drier (or at least less rocky) *Artemisia tridentata* and *Festuca idahoensis*-dominated rangelands and pure *Cercocarpus ledifolius* stand and on moister sites open to closed forests of the P. flexilis and Pseudotsuga menziesii series.

Vegetation- Tree canopies are very open with scattered *Pinus flexilis* and *Pseudotsuga menziesii* and, in younger stands, well represented *Juniperus scopulorum*. The shrub stratum is dominated by well represented to abundant *Cercocarpus ledifolius*; *Artemisia frigida* and *Gutierrezia sarothrae* are consistently present but poorly represented. *Agrpyron spicatum* and *Oryzopsis hymenoides* (or *O. micrantha*) and , only in extreme southwestern Montana, *Hesperochloa kingii* are the dominant graminoids; their cover varies widely but never was noted to exceed 10-15%. Forbs diversity may be appreciable but cover seldom exceeds trace amounts, with the exception of *Cymopterus bipinnatus* and *Petrophyton caespitosum*.

Soils- PINFLE/CERLED has been documented only from calcareous substrates in Montana, sites with shallow soils and rock and gravel exposure usually exceeding 30%. Soils are silt loams but the gravel content severly diminishes their water holding capacity but may facilitate its deep percolation to leves tapped by deep rooted shrubs and trees.

Other Studies- This minor type was first recorded for Montana in a preliminary report (DeVelice 1992) regarding southwestern counties and it is very similar to PSEMEN/CERLED described for the Pryor Mountains (DeVelice and

Lesica 1993). The type extends as an incidental type to northwestern Wyoming (Steele et al. 1983) and eastern central Idaho (Steele et al. 1981) but further to the south in northern Utah it is more extensive (Mauk and Henderson 1984).

Comments- *Cercocarpus ledifolius* constitutes an important source of winter browse for big game species but in higher coverages may limit the production of forbs and graminoids.

Natural Heritage Program Rank- G3G4/S3

Pinus flexilis/Festuca idahoensis p.a.
(PINFLE/FESIDA; limber pine/Idaho fescue)

Environment- PINFLE/FESIDA is commonly found on west- to south-facing aspects of moderate to steep slopes often associated with upper slope, wind-exposed conditions. The observed elevation range was 7,500 to 8,800 ft., though in fact it is probably greater. Adjacent drier sites support *Festuca idahoensis* and *Artemisia tridentata* var. *vaseyana*-dominated rangeland communities; it grades to *Pseudostsuga menziesii* series sites of moister habitats at lower elevations and to Picea series sites at upper elevations. This plant association was not noted in the Centennial Range proper due to the lack of appropriate substrates (calcareous) and exposures on this north-facing flank.

Vegetation- Widely spaced *Pinus flexilis* dominate the upper statum in these open, savanna-like all-aged appearing stands (at least stands not readily accessible to tree harvesting) wherein total canopy cover usually does not exceed 60%. *Pseudotsuga menziesii* may be well represented or even co-dominant , but size-class distributions indicate *P. flexilis* will continue to be at least a co-dominant component. *Juniperus scopulorum* may be well represented as a long-persisting seral species. Scattered, old (>250 yrs.) fire-scarred individuals (both *P. menziesii* and *P. flexilis*) with multiple fire-scars are usually present indicating a past history of ground-fires or fires creating a mosaic of age classes.

Undergrowth is dominated by bunchgrasses with *Festuca idahoensis* common indicating habitat more moist than those supporting just *Agropyron spicatum* or *Hesperochloa kingii* as dominants. In extreme southwestern Montana *H. kingii* is a conspicuous, occasionally dominant, component. Forb diversiy is often high with *Phlox hoodii*, *Machaeranthera canescens*, *Astragalus miser*, *Senecio canus* and *Linum perenne* being consistently represented. Shrubs commonly found scattered in canopy opeings are *Juniperus communis*, *Artemisia tridentata* var. *vaseyana*, *Ribes cereum* and *Chrysothamnus nauseosus*.

Soils- All stands sampled and noted in reconnaissance were developed on calcareous substrates having much, usually 20% plus, exposed soil and gravel/rock; these substrates have weathered to silt loam textures.

Other Studies- PINFLE/FESIDA is a major plant association of calcareous substrates along the Rocky Mountain Front and ranges of central Montana (Pfister et al. 1977) and continues as a notable component to southcentral and southwest Montana and extends as a minor type to east-central Idaho (Steele et al. 1981) and northwestern Wyoming in the rainshadow of the Absaroka Range and the very dry Owl Creek Range (Steele et al. 1983).

Comments- Intensive cattle grazing in this type can virtually eliminate the bunchgrass component, or at least reduce the cover of *F. idahoensis* and *A. spicatum* to the point where site potential is not discernable; the fact that grass cover is considerably less than open rangelands does not seem to lessen the degree of impact.

Natural Heritage Program Rank- G5/S5

Pinus flexilis/Juniperus communis p.a.
(PINFLE/JUNCOM; limber pine/common juniper)

Environment- This minor type was sampled at 5,800 ft. on calcareous substrates with a moderate exposure. It was not encountered in reconnaissance further south than the Dewey, MT vicinity (it is common along the Rocky Mountain Front to the north). Drier sites are occupied by *Cercocarpus ledifolius/Agropyron spicatum* and moister ones by the *Pseudotsuga menziesii* series.

Vegetation- The one plot is typical for the type at large as described by Pfister et al. (1977) with *Pinus flexilis* dominating the canopy and *Pseudotsuga menziesii* and *Juniperus scopulorum* as subordinate species, but with population structure indicating *Pseudostuga* would not outcompete *P. flexilis*.

The undergrowth is dominated by the trailing shrub *Arctostaphylos uva-ursi* and *Juniperus communis*. Under the appreciable grazing pressure the highly palatable bunchgrass *Agropyron spicatum* was present as mostly consumed scattered clumps. The lack of *Festuca idahoensis* may be attributable to grazing pressure as it is common in the general vicinity. *Astragalus miser* is the dominant forb as it is in most occurrences of this association.

Soils- Sampled substrates were calcareous sandstones and weathered to silty sands with approximately 20% exposed gravel and rock. With high shrub cover the litter cover was comparably high.

Other Studies- PINFLE/JUNCOM is found as far west as the Blue Mountains of Oregon (Cole 1982) and Lost River and Lemhi Ranges of Idaho (Steele et al. 1981) where it is an incidental type and increases in importance to the east where it's extensive along the Rocky Mountain Front of Montana (Pfister et al. 1977) and Wyoming (Steele et al. 1983). In southeastern Wyoming (Alexander et al. 1986) and northwestern Colorado (Johnson 1987) it's extent is again reduced relative to its representation in Montana.

Natural Heritage Program Rank- G5/S4

Pinus flexilis/Agropyron spicatum p.a.
(PINFLE/AGRSPI; limber pine/bluebunch wheatgrass;
WHTF designation *Pinus flexilis/Pseudoroegneria spicata*)

Environment- PINFLE/AGRSPI is found on the driest exposures capable of supporting trees, steep southeast- through southwest-facing slopes. The noted study area elevation range was from 5,500 to 7,600 ft. but it could occur at higher elevations. This type is usually found in a mosaic of grassland/shrubland on deeper soils with adjacent forest types being PINFLE/CERLED or /JUNCOM on rockier sites.

Vegetation- Widely spaced *Pinus flexilis* usually dominates the canopy, often in conjuction with *Juniperus scopulorum* and *Pseudotsuga menziesii*; in early seral stands *J. scopulorum* can have greater cover than other tree species but in the aggregate the visual expression is that of a very open forest or savanna.

Undergrowth cover is intrinsically low and with cattle grazing may loo especially depauperate. *Agropyron spicatum* well represented is diagnostic for the type; usually it is the dominant herb but in the southwestern extreme *Hesperochloa kingii* may be a co-dominant or even dominant with cattle grazing preferentially removing *A. spicatum*. Contribution of herbs from contiguous grasslands, e.g. *Oryzopsis hymenoides, Koeleria cristata, Phlox hoodii, Senecio canus, Liatris punctata, Draba* spp., *Oxytropis* spp. and *Linum perenne*, often produce a species-rich undergrowth. Combined shrub cover seldom exceeds 5% with *Artemisia frigida, A. tridentata, Gutierrezia sarothrae, Ribes cereum* and *Symphoricarpos oreophilus* being the most commonly represented.

Soils- This type was noted only on calcareous substrates, both sandstone and limestone, with exposed surfaces of soil, gravel and rock often exceeding 60%.; from the descriptions of others there is reason to expect this type on

othger than calcareous parent materials.

Other Studies- This type is found all along the Rocky Mountain Front and scattered ranges of central (Pfister et al. 1977) as well as southwestern Montana (DeVelice 1992). This type is not identified for contiguous states to the south because the cline of increasing *Heperochloa kingii* toward the south causes these *Pinus flexilis*-dominated stands with *A. spicatum* to be termed PINFLE/HESKIN (see Steele et al. 1981, 1983); PINFLE/HESKIN extends to the Medicine Bow Range of southeastern Wyoming (Alexander et al. 1986).

Natural Heritage Program Rank- G4/S4

Pinus albicaulis/Abies lasiocarpa Community Type
(PINALB-ABILAS; whitebark pine-subalpine fir)

Environment- The type occurs on glaciated mountain ridges and upper slopes at elevations above 8900 feet. The total cover of soil, gravel, and rock exceeds 50%. The soil surface is often unstable because of a lack of adequate vege-tation cover.

Vegetation- *Pinus albicaulis, Abies lasiocarpa, Picea engelmannii,* and occasionally *Pseudotsuga menziesii* occur in varying amounts in the often open, stunted, and wind-deformed tree layer. The undergrowth is highly variable in composition and few individual species ever exceed 5% cover.

Adjacent Communities- This type occurs at, or near, upper timberline. It is often bordered below by the *Abies lasiocarpa-Pinus albicaulis/Vaccinium scoparium* type and above by alpine scrub. Unvegetated talus slopes sometimes interfinger with this type.

Soils- Soils are typically gravelly to very gravelly, feature a cryic temperature regime, and may be strongly to violently effervescent. Textures are sandy loams to loams. Soil depth is shallow to moderately deep. Available water holding capacity varies from low to medium.

Other Studies.--This type has been described only in Montana, where it is quite common (Pfister et al.1977).

Comments- PINALB-ABILAS is actually a syntaxonomic unit above the community type level because considerable undergrowth variation is accommodated within it as originally described. Pfister et al (1977) did not choose to decompose this unit on the basis of various undergrowth assemblages because it encompasses environments with very low production and similar management implications.

Natural Heritage Program Rank- G5/S5

Pinus albicaulis/Festuca idahoensis p.a.
(PINALB/FESIDA; whitebark pine/Idaho fescue)

Environment- The PINALB/FESIDA association is a minor type occurring at the highest forested elevations, generally above 8,600 ft., of the Centennial and Tendoy Ranges on wind-swept ridgeslines and west and southwest-facing slopes. Ostensibly drier sites are *Festuca idahoensis-* or *Artemisia tridentata* var. *vaseyana*-dominated; to moister or less stressful exposures are found ABILAS/RIBMON, ABILAS/ARNCOR and PICEA/SENSTR.

Vegetation- *Pinus albicaulis* dominates an open canopy generally not exceeding 60% coverage.
Scattered *Pinus contorta* and stunted *Picea* or *Abies lasiocarpa* may be present; ring counts for trees taken in the most open portion of these stands indicated ages of 40 to105 years for trees not exceeding 6 ft. and thus lacking any potential to respond to stand opening and establishment of dominance.

Undergrowth in undisturbed stands of this type is dominated by *Festuca idahoensis* (seen in adjacent mountain ranges) but in the Centennials and Tendoys sheep grazing has led to reduction of the forb component and the introduction of *Poa pratensis*, which has become well represented in some stands. *Trisetum spicatum* and *Poa nervosa* are consistently present though coverages are seldom even common. Forbs consistently present include *Antennaria microphylla, Solidago multiradiata* and *Astragalus miser*.

Soil- PINALB/FESIDA was noted to occur on both calcareous and extrusive volcanics which weather to silt loam and loam textures. Exposed substrate is commonly less than 10% and litter is usually 80% plus and relatively deep (1 inch plus).

Other Studies- This is a minor to incidental type from southern Montana and northwestern Wyoming (Steele et al. 1983) and east-central Idaho (Steele et al. 1981) and is not reported elsewhere.

Natural Heritage Program Rank- G4/S4

Pinus contorta/Carex rossii community type
PINCON/CARROI; lodgepole pine/Ross sedge

Environment- Within the Dillon R.A. this community is apparently restricted to peculiar parent materials, possibly hydrothermally altered volcanics. PINCON/CARROI was noted as very small stands (mostly < 1 acre) at scattered, low gradient valley locations surrounded by a mosaic of *Artemisia tridentata-* and *Festuca idahoensis*-dominated shrublands/grasslands. The soils are light-colored, highly reflective, virtually without structure but well-drained and have very little incorportated organic matter. We suspect these substrates, as is typical for hydrothermally altered substrates, are more acidic than those of the surrounding rangelands; the actual composition for these parent materials have not been confirmed by persons with geological expertise.

Vegetation- The canopies are open (40-70% cover) and dominated by *Pinus contorta* and *Pinus flexilis* and they were the only species noted to be reproducing. These sites are well within the range of seed rain of various coniferous tree species, most particularly *Pseudotsuga menziesii*, but none have been able to colonize these sites due to the unusual nature of the substrate and the fact that sites are outside the climatic window of species associated with subalpine conditions.

The undergrowth is very sparse (combined cover not exceeding 5%) with extremely low species diversity, generally fewer than five species per 1/10 acre. *Carex rossii* is the most abundant species and, with *Carex geyeri,* the only graminoids encountered. *Penstemon aridus* was the only forb consistently present.

Soils- Except for 5-20% litter, the surface is exposed soil with little incorporated organic matter resulting in a notably light-colored and reflective surface. There is virtually no profile development and soils are well drained. Expected low pH values and perhaps peculiar micronutrient and nutrient levels strongly condition the vegetation response.

Other studies- PINCON/CARROI is described as an uncommon community type (seral status uncertain, but very long-persisiting *P. contorta* dominance) from the Yellowstone region southward to the Wind River Range (Steele et al. 1983); in the Yellowstone region it supports only scattered *Pinus flexilis* (or *P. albicaulis*) and is associated with extrusive volcanics (mostly rhyolite) that weather to a coarse-textured, excessively-drained substrate, much like those that it occupies within our study area.

Natural Heritage Program Rank- G5/SP (This c.t. may require a special recognition, e.g. *Pinus contorta/Carex rossii*-hydrothermal sites, as the substrate is so unusual as to constitute a unique environment.)

Juniperus scopulorum/Cercocarpus ledifolius Community Type
(JUNSCO/CERLED; Rocky Mountain juniper/mountain mahogany)

Environment- This type occurs predominantly on steep dip slopes and residual mountain slopes at elevations between 5500 and 6500 feet. The total cover of soil, gravel, and rock usually exceeds 50% and the soil surface is often unstable because of a lack of adequate vegetation cover

Vegetation- *Juniperus scopulorum* is the only tree species present. Abundant *Cercocarpus ledifolius* characterizes the undergrowth. Other species that are generally present with cover exceeding 1% include *Artemisia frigida, Opuntia polyacantha, Agropyron spicatum*, and *Oryzopsis hymenoides.*

Soils- Parent materials are predominantly quartzite or limestone and soils are generally Orthents and are shallow (lithic) and gravelly to very stony. Textures vary from loamy sands to loams. Most of the soils exhibit strong and/or violent effervescence. Available water holding capacity is mostly low due to the coarse soil textures, abundant coarse fragments, and shallow depth.

Adjacent Communities- The *Juniperus scopulorum/Cercocarpus ledifolius* and *C. ledifolius/Agropyron spicatum* types are ecologically similar and intergrade. Of the two types, *J. scopulorum/C. ledifolius* occurs in slightly more mesic situations. The *J. scopulorum/Artemisia tridentata* and *A. tridentata/Agropyron spicatum* types adjoin *J. scopulorum/Cercocarpus ledifolius* on drier sites. The *Agropyron spicatum/Bouteloua gracilis* type is often found on adjacent less rocky and less steep sites.

Other Studies- This type has been described only for Montana (Chaffee 1981).

Natural Heritage Program Rank- G4/S4

Juniperus scopulorum/Artemisia tridentata CommunityType
(JUNSCO/ARTTRI; Rocky Mountain juniper/big sagebrush)

Environment- The type occurs on plateaus and residual mountain slopes at elevations between 5500 and 6000 feet. The total cover of soil, gravel, and rock averages 70%. The soil surface is sometimes unstable because of a lack of adequate vegetation cover.

Soils are generally shallow or very shallow (i.e., lithic) and are derived from igneous or sedimentary parent materials and feature strong to violent effervescence. Textures vary from sandy loams to silt loams and are gravelly to very gravelly. Available water holding capacity varies from low to medium.

Vegetation- *Juniperus scopulorum* is the only tree species present. Species exceeding 5% cover in the undergrowth include *Artemisia tridentata, Opuntia polyacantha, Agropyron spicatum, Aristida longiseta, Bouteloua gracilis, Oryzopsis hymenoides*, and *Stipa comata.*

Adjacent Communities- The *Artemisia tridentata/Agropyron spicatum* community type often occurs on adjacent less rocky sites with deeper soils. More mesic sites with similar soils feature the *Juniperus scopulorum/Cercocarpus ledifolius* community type.

Other Studies- This type has not been previously described but has been reported as a possible type in Colorado and Wyoming (Bourgeron and Engelking 1991).

Natural Heritage Program Rank- G2?/S2?

Populus trichocarpa/Poa pratensis community type
(POPTRI/POAPRA; black cottonwood/Kentucky bluegrass)

Environment- POPTRI/POAPRA is cited by Hansen et al. (1991) to be a major forested riparian type of western Montana; it is uncommon within the study area being found on alluvial terraces of major steams and rivers as well as bordering ponds and lakes. The type as defined by Hansen et al. is a default class within the *Populus trichocarpa* series and thus very inclusive of both environmental and vegetation variation; that this type incorporates sites subjected to periodic disturbances such as flooding and erosion/deposition and intensive grazing further adds to site heterogeneity but the grazing pressure can also result in solid swards of introduced, rhizomatous grasses (eventually to weed-choked terraces). Upslope these sites usually abruptly give way to *Artemisia tridentata* var. *vaseyana* or tridentata dominated shrub steppe.

Vegetation- This type has a simple two layer structure of mostly open *Populus trichocarpa* over a sward of introduced rhizomatous grasses, *Poa pratensis* and *Phleum pratense* and the rhizomatous-appearing *Poa palustris*. Other commonly occurring grasses include *Bromus inermis*, *Carex praegracilis*, *C. utriculata* and *Phalaris arundinacea*. *Solidago gigantea* and *Smilacina stellata*, Thermopsis montana and *Taraxacum officinale* are consistently present and capable of occurring well represented.

Soils- There was a conspicuous lack of horizonation in these alluvium-derived soils of loam to silty loam to coarse sand that had a notable gravel component at greater depths. There is notable spatial heterogeneity due to active and past fluvial processes.

Other Studies- The POPTRI/POAPRA zootic disclimax has been described for only Montana; it has been documented by Hansen et al. (1991) to be a major riparian type of low- to mid-elevations throughout the foothills and mountains of Montana.

Natural Heritage Program Rank- G4/S4

Populus tremuloides/Thalictrum fendleri c.t.
(POPTRE/THAFEN; trembling aspen/Fendler's meadowrue)

Environment- POPTRE/THAFEN is a common community type found along the foothills to the Centennial Range, often associated with slumps and pockets of loessal soils. This type generally occupies benches or gentle north- or east-facing slopes. This type was not found above 7,400 ft elevation. Adjacent communities of drier (?) environments are POPTRE/Calamagrostis rubescens, *Pseudotsuga menziesii/Calamagrostis rubescens* or ARTTSV/*Festuca idahoensis*; it grades to POPTRE/*Cornus stolonifera* or most oftern POPTRE /*Osmorhiza occidentalis* of moister environments (recognized by 5% coverage of *Viola canadensis*, *Heracleum lanatum*, *Actaea rubra*, *O. occidentalis* or *Galium triflorum*).

Vegetation- The overstory is generally a closed canopy of *Populus tremuloides*; the understory may be dominated (but cover not exceeding 10-20%) by a younger age-class of *P. tremuloides* but more often a scattering (cover < 10) of *Pseudotsuga menziesii*, *Abies lasiocarpa* or *Picea engelmannii* is found. These "climax" species are slow to establish and equally slow to exert dominance. A *P. tremuloides*-dominated stand in excess of 100 years old had no more than 10% of the aforenamed climax tree species and they had all established within the last 40 years. Wild ungulate browsing on the *Abies lasiocarpa* was evident but the other two species fared no better in their growth rates.

Shrubs, including the highly constant *Symphoricarpos oreophilus*, *Rosa woodsii*, and *Berberis repens*, are poorly represented; Shepherdia canadensis can be well represented in small patches and may represent fragments of the POPTRE/SHECAN c.t. but does not appear to be associated with a particular environmental feature. The dominant aspect of this c.t. in good condition is that of a low-forb layer with highly variable coverage of introduced rhizomatous (*Poa pratensis*, *Phleum pratense*) and native grasses (*Bromus ciliatus*, *B. vulgaris*, *B. carinatus*, *Elymus*

glaucus and *Agropyron caninum*) The coverage of introduced grasses may be abundant on grazing-impacted sites. In its modal form the diagnostic forbs *Thalictrum fendleri* (or *T. occidentale*), *Osmorhiza chilensis* (or *O. depauperata*), and *Geranium viscossisimum* have at least 10% cover, singly or in the aggregate. Other species noted to be consistently present and associated with even more mesic conditions than those listed above include *Ligusticum filicinum, Geranium richardsonii, Geum macrophyllum, Smilacina stellata,* and *Mertensia ciliata. Taraxacum officinale, Descurainia pinnata* and *Myosotis arvensis* are increaser forbs with grazing.

Soils- The only excavated pit showed deep (>100 cm) silt loam with no rock or gravel and a mollic epipedon at least 30 cm thick. Other exploratory excavations of this c.t. found the upper profile to be mollic and totally lacking rock or gravel. The litter layer is continuous and very thin, as is the humus layer as is typical for productive Populus tremuloides-dominated stands. In extremely overgrazed areas *P. pratensis* may be reduced to poorly represented and *T. officinale* and *Achillea millifolium* are dominant.

Other Studies- For the Intermountain region Mueggler (1988) has defined as areally extensive a POPTRE/THAFEN c.t. that ranges from northwestern Wyoming to eastern Idaho (as */Geranium viscossisimum* c.t. Mueggler and Campbell 1982) and Utah (Mueggler and Campbell 1986) and southeastern Wyoming (Alexander et al. 1986). POPTRE/THAFEN is apparently very abundant in western Colorado (Johnson 1987).

Comments- Mueggler (1988) remarks that this c.t. appears to slowly succeed to the ABILAS/OSMCHI habitat type; population structure of stands in our study area seem to substantiate this observation.

Natural Heritage Program Rank- G5/S? (State rank not yet assigned as this is the first description of this community type for the state)

Populus tremuloides/Poa pratensis c.t.
(POPTRE/POAPRA; trembling aspen/Kentucky bluegrass)

Environment- POPTRE/POAPRA is a common grazing-induced community type found along the foothills to the Centennial Range, often associated with slumps and pockets of loessal soils. This type generally occupies benches or gentle north- or east-facing slopes. The classification manual of Montana's riparian/wetland vegetation (Hansen et al. 1991) recognizes a portion of this type to occupy wetland sites (including requisite soil and hydrological properties) but not of the POPTRE/POAPRA sites we noted were candidate wetlands; at most they could be considered mesic sites in water receiving positions but lacking even facultative hydrophytes. Adjacent communities are the putatively less grazing-impacted POPTRE/*Thalictrum fendleri* c.t. and *Pseudotsuga menziesii/Calamagrostis rubescens* or on drier transitions ARTTSV/*Festuca idahoensis*.

Vegetation- The overstory is generally a closed canopy of *Populus tremuloides*; the understory may be dominated (but cover not exceeding 10-20%) by a younger age-class of *P. tremuloides* but more often a scattering (cover < 10) of *Pseudotsuga menziesii, Abies lasiocarpa* or *Picea engelmannii* is found. These "climax" species are slow to establish and equally slow to exert dominance. Two 80-100 year old *P. tremuloides*-dominated stands had no more than 5% of the aforenamed climax tree species and they had all established within the last 30 years. Wild ungulate browsing on the *Abies* was evident but the other two species fared no better in their growth rates.

Like the conifers the shrubs, *Symphoricarpos oreophilus, Berberis repens, Prunus virginianus* (heavily browsed) and *Rosa woodsii*, are an insignificant component of the vegetation complex. This type generally supports a lush sward of *Poa pratensis* in which *Bromus carinatus, B. ciliatus, Agropyron caninum* and *Elymus glaucus* have been reduced to minor components from what are assumed to be their pre-disturbance levels. *Phleum pretense* well represented was assumed to denote an even further degraded condition. Forb composition may be diverse and even include indicators of relatively mesic conditions (*Thalictrum occidentale, T. fendleri, Osmorhiza chilensis, Geranium viscossisimum* and *Valeriana dioica*) but coverages of mesic indicator, even combined, do not exceed 5% whereas weedy species (*Taraxacum officinale, Trifolium repens*) may be abundant.

Soils- The only excavated pit showed deep (>80 cm) silt loam with no rock or gravel and a mollic epipedon at least 20 cm thick. Other exploratory excavations of this c.t. found the upper 10-20 cm to be mollic with virtually no rock or gravel. In extremely impacted areas *P. pratensis* may be reduced to poorly represented and *T. officinale* is dominant.

Other Studies- Mueggler's monograph (1988) of aspen in the Intermountain region describes POPTRE/POAPRA as a minor type, a grazing-induced deflection of the POPTRE/*Thalictrum fendleri*, POPTRE/*Symphoricarpos oreophilus*/THAFEN, POPTRE/SYMORE/*Calamagrostis rubescens*, and POPTRE/CALRUB community types from Utah, Nevada, northward to the Bridger-Teton N.F. of Wyoming and Targhee of Idaho. In Colorado it is speculated to be a disturbance-induced version of POPTRE/CALRUB. In Montana Hansen et al. (1991) recognize POPTRE/POAPRA as a major type, part of the riparian complex, though not always a jurisdictional wetland. Hansen et al's concept of this type is probably broader than those of the the Intermountain region as Hansen et al. cite a different suite of browsed-out shrubs e.g. *Cornus stolonifera*, *Prunus virginiana*, *Alnus incana* and *Salix species*.

Natural Heritage Program Rank- Because anthropogenic c.t. no G-rank assigned/SP (indicating purported presence, from circumstantial report but no supporting data [at time classification was compiled]).

Potentilla fruticosa/Deschampsia cespitosa community type
(POTFRU/DESCES; shrubby cinquefoil/tufted hairgrass;
WHTF designation *Pentaphylloides floribunda/Deschampsia cespitosa*)

Environment- These alkaline meadows occur on subirrigated flood plains, stream terraces and gentle lower slopes, often in association with springs or seeps; though falcultative hydrophytes are often abundant these do not consistently possess hydrologic regimes or soil characteristics indicating jurisdictional wetlands. This c.t. was found at 5,000-7,500 ft throughout the study area, most often in areas of calcareous parent material. Most examples of this type have hummock-hollow microtopography. Adjacent vegetation on wetter soils is often dominated by *Salix* spp. and *Carex utriculata* or *Carex simulata* fen or *Juncus balticus* and *Deschampsia cespitosa*. Drier sites may be dominated by *Elymus cinereus, Carex praegracilis* and *Puccinellia distans*. Adjacent upland communities are dominated by *Artemisia tridentata, A. tripartita* or *A. longiloba* and *Festuca idahoensis*.

Vegetation- *Potentilla fruticosa* is the only common shrub with 10-30% cover. Dominant graminoids, usually well represented, are *Juncus balticus* and *Deschampsia cespitosa*. Other common species include *Carex praegracilis* and *Muhlenbergia richardsonis*. Forbs are diverse and may be abundant, up to 35% cover. Common species include *Aster occidentalis, Senecio debilis, Allium schoenoprasum* and *Valeriana edule. Taraxacum officinale, Poa pratensis* and *Iris missouriensis* may be common in stands that have been heavily impacted by livestock grazing. Mosses are common in some stands.

Soils- Soils have a silty texture and an alkaline reaction; some may be slightly saline as well. Soils are moist to wet for at least the first half of the growing season. There is very little bare ground and no surface gravel.

Other Studies- Hansen et al. (1991) and Lesica (1990) describe a POTFRU/DESCES habitat type for western Montana. Similar vegetation has been described for Idaho, Utah and western Wyoming (Youngblood et al. 1985, Padgett et al. 1989, Chadde et al. 1988).

Comments- Hansen et al. (1991) believe that the abundance of *Juncus balticus* is positively correlated with overgrazing. However, we believe that other factors, such as hydrologic regime, salinity and soil reaction may also affects the relative dominance of *J. balticus* and *Deschampsia cespitosa* (see comments under JUNBAL/CARPRA.

The POTFRU/DESCES c.t. is similar in composition to the DESCES c.t. and the JUNBAL/CARPRA c.t. The presence of *Potentilla fruticosa* is undoubtedly related to the degree of soil aeration; i.e., *P. fruticosa* will increase as soils become drier. However, this relationship is also influenced by the degree of hummocking. Hummocks

provide a better aerated environment and allow *P. fruticosa* to occur in areas where it otherwise would not. It is not known how hummocks are formed, but frost action may play a role. Trampling by livestock enhances the hummocks and probably allows shrubs to become larger and more frequent. It is also possible that trampling by livestock and other large animals is the primary cause of the hummocks. DESCES and JUNBAL/CARPRA types can probably be converted to POTFRU/DESCES by the formation of hummocks.

This vegetation is productive and often remains green throughout the growing season, making it attractive to livestock, especially late in the year. The moist to wet soils and generally small size of stands make this type very prone to degradation. Trampling by livestock, especially during the spring and early summer results in the formation or enhancement of hummocks. The presence of substantial hummocking may cause an increase of the shrub, *Potentilla fruticosa.*

Natural Heritage Program Rank- G4/S4

***Potentilla fruticosa/Potentilla ovina* communiy type**
(POTFRU/POTOVI; shrubby cinquefoil/sheep cinquefoil;
WHTF designation *Pentaphylloides floribunda/Potentilla ovina*)

Environment- This uncommon type occurs in broad swales of gently sloping alluvial fans in areas of calcareous parent material. These sites may be subirrigated during part of the year; they have the appearance of being salt-affected and possibly experience soil loss through sheet erosion on an annual basis. POTFRU/POTOVI is found at 7,000-7,400 ft towards the headwaters of Big Sheep Creek in the Beaverhead and Tendoy mountains. Adjacent upland vegetation is dominated by *Artemisia tridentata wyomingensis* or *A. longiloba* and *Festuca idahoensis.*

Vegetation- The only shrub is *Potentilla fruticosa* with canopy cover of ca. 30%. Ground layer vegetation is sparse. Graminoid canopy cover is usually less than 20%; species with high constancy and at least common coverage are *Muhlenbergia richardsonis, Agropyron smithii, Carex scirpoidea* and *Poa juncifolia.* Forbs frequently present include *Potentilla ovina, Gentiana affinis, Viola nephrophylla, Aster occidentalis* and *Hedysarum sulphurescens.* Mosses and lichens are absent, perhaps stripped by a flooding regime.

Soils- Soils have a silty texture and a near-neutral to alkaline reaction. They appear to be shallow and stony with ca. one third of the surface covered with gravel or rock. Over 50% of the soil surface is bare.

Other Studies- Similar vegetation has not been previously described.

Comments- Soil appears to have been removed from these sites by water, although this seems implausible given the nearly level slope. Perhaps wind erosion following severe overgrazing caused the shallow soils. This type bears some similarity to POTFRU/DESCES; however, it has very different soils and herbaceous species that indicate drier conditions.

Trampling by livestock during the spring when these sites are wet results in soil compaction and a decrease in productivity.

Natural Heritage Program Rank- (No rank has been assigned, but probably will be high due to its putative scarcity)

Artemisia longiloba/Festuca idahoensis community type
(ARTLON/FESIDA; low sagebrush/Idaho fescue)

Environment- Gentle slopes of broad low ridges, alluvial fans and terraces at 6,900-7,200 ft may support vegetation dominated by *Artemisia longiloba* and *Festuca idahoensis*. This type usually occurs in areas of calcareous parent material. Sheet erosion is evident in many stands. Adjacent deeper and/or better drained soils support *Artemisia tridentata wyomingensis* or *vaseyana* and *Festuca idahoensis* or *Agropyron spicatum*. ARTLON/FESIDA gradually merges into the ARTLON/AGRDAS c.t. on lower and gentler slopes with heavier soils.

Vegetation- The dominant shrub is *Artemisia longiloba* with 10-20% canopy cover. *Chrysothamnus viscidiflorus* occurs in most stands. *Artemisia tridentata* and *A. tripartita* may occur when they occupy adjacent stands. Total grass canopy cover averages ca. 40%. *Festuca idahoensis* is the dominant grass with 20-40% cover. Other common grasses include *Agropyron dasystachyum, A. spicatum, Koeleria cristata* and *Poa secunda*. Forb cover is rarely greater than 10%. Common species include *Antennaria microphylla, Geum triflorum, Linum lewisii, Phlox hoodii* and *Taraxacum officinale*. Mosses are rare, but lichens are common in some stands.

Soils- Soils have a silty to clayey texture and are usually calcareous and perhaps saline as well. 20-70% of the soil surface may be bare or covered with gravel.

Other Studies- Similar vegetation has been reported for Nevada (Zamora and Tueller 1973) and Idaho (Tisdale et al. 1965) and likely occurs in Wyoming and Oregon as well (Bougeron and Engelking 1992).

Comments- See comments under ARTNOV/AGRSPI. In Montana, this association is known only from southern Beaverhead County.

Natural Heritage Program Rank- G3/S2

Artemisia longiloba/Agropyron dasystachyum community type
(ARTLON/AGRDAS; low sagebrush/thick-spike wheatgrass;
WHTF designation *Artemisia longiloba/Elymus lanceolatus* ssp. *lanceolatus*)

Environment- ARTLON/AGRDAS is found on gently sloping terraces and lower slopes of alluvial fans as well as broad, low ridges at 6,600-7,200 ft, usually in areas of calcareous parent material. Adjacent communities on moist stream terraces may be dominated by *Potentilla fruticosa, Juncus balticus, Carex praegracilis, Deschampsia cespitosa, Elymus cinereus* or *Poa juncifolia*. Deeper or better drained soils are dominated by *Artemisia tridentata* ssp. *wyomingensis* or *A. tripartita* and *Agropyron dasystachyum* or *Festuca idahoensis*.

Vegetation- *Artemisia longiloba* is the dominant shrub with 10-40% canopy cover. Other common shrubs include *Chrysothamnus nauseosus* and *C. viscidiflorus*. *Artemisia frigida* is a common subshrub. Grass cover was 30-70%. *Agropyron dasystachyum* is the dominant tall grass with 10-50% cover. Other common grasses include *Poa secunda, P. cusickii* and *P. juncifolia*. Forb cover is only ca. 10%, and diversity is low. Highly constant, usually poorly represented forb species include *Phlox hoodii, Antennaria microphylla, A. parvifolia* and *Erigeron compositus*. Mosses are absent, but lichens may be common.

Soils- Soils have a silty to clayey texture and are usually calcareous and perhaps saline as well. 30-70% of the soil surface is bare. There is little or no surface gravel.

Other Studies- Vegetation dominated by *Artemisia longiloba* and *Agropyron smithii* (syn. *Pascopyrum smithii*), another rhizomatous wheatgrass, is reported for Colorado (Bougeron and Engelking 1992). ARTLON/AGRDAS is likely similar or equivalent to this type since the two species of *Agropyron* often behave as virtual ecological

equivalents in Montana.

Comments- This type is used by antelope and may be important deer and elk winter range. See comments under ARTNOV/AGRSPI. This association occurs only in southern Beaverhead County in Montana.

Natural Heritage Program Rank- GU/S? (This community not yet ranked for MT and may be rare across its range)

Artemisia tridentata ssp. *tridentata/Agropyron smithii* community type
(ARTTST/AGRSMI; big sagebrush/western wheatgrass;
WHTF designation *Artemisia tridentata* ssp. *tridentata/Pascopyrum smithii*)

Environment- This type is common on gently slope to nearly level stream terraces at 5,900-7,200 ft in the Tendoy Mountains; very limited areas of ARTTST/AGRSMI were noted in reconnaissance of the Centennial Valley and other locations within the northern portion of Dillon Resource Area. Sites are often associated with dry stream channels and thus have a low gradient. The landscape location and vegetation might be considered riparian but the type is not a jurisdictional wetland using soils and hydrological criteria. Parent material is alluvium derived from limestone and quartzite. Adjacent upslope sites support sagebrush steppe dominated by *Artemisia tridentata tridentata* or *vaseyana* and *Festuca idahoensis*; in the Yellowstone Ecosystem this type was noted to grade to *Artemisia cana/Pascopyrum smithii* of moister regimes. Cool slopes are dominated by *Pseudotsuga menziesii* or *Pinus flexilis* forests, and very rocky slopes support *Cercocarpus ledifolius* woodlands.

Vegetation- *Artemisia tridentata* ssp. *tridentata* is the dominant shrub with canopy cover ranging from 10 to 50%. *Chrysothamnus nauseosus* and *C. viscidiflorus* occur, poorly represented, in many stands. The subshrub, *Artemisia frigida*, may be common in some stands. Grass cover is high to nearly continuous in most stands. *Agropyron smithii* and/or *A. dasystachyum (*in our concept of the type) are the dominant and diagnostic grass species. *Poa pratensis* and *Elymus cinereus* may be abundant. *Agropyron spicatum* and small bluegrasses such as *Poa secunda, P. juncifolia*, or *P. cusickii* are often present. Forb cover is usually 10% or less, and diversity is low to moderate. *Achillea millefolium, Antennaria microphylla, Erigeron compositus, Senecio canus* and *Taraxacum officinale* are species with high constancy. Mosses and lichens are often present and may be common.

Soils- Soils are very deep with a silty to loamy texture. Some may be slightly saline. The amount of bare soil surface varies between 10% and 70%, but there is no surface gravel.

Other Studies- Mueggler and Stewart (1980) describe associations dominated by *Sarcobatus vermiculatus* and either *Agropyron smithii* or *Elymus cinereus* for western Montana. These types have a similar herbaceous layer to ARTTST/AGRSMI but the dominant shrub is *S. vermiculatus*. An *Artemisia tridentata* ssp.*tridentata/Agropyron smithii* c.t. (as ARTTRT/PASSMI) is reported for Colorado and Nevada, and an ARTTST/*Elymus cinereus* type is reported for Colorado, Idaho and Oregon (Bougeron and Engelking 1992).

Comments- Most sites that are mesic enough to support *Artemisia tridentata* ssp. *tridentata* will probably also support a robust grass such as *Elymus cinereus*. Heavy spring and early summer grazing of these bottomland sites would favor the shorter, rhizomatous *Agropyron smithii* over the more robust, bunch-forming *E. cinereus*. We hypothesize that heavy grazing in the early part of the century removed most *E. cinereus* from these sites. With light grazing it is conceivable that *E. cinereus* chould eventually regain dominance. This type might be best be considered a disclimax of the ARTTST/ELYCIN plant association but only exclosures established before the cattle industry was initiated could pose an answer.

Natural Heritage Program Rank- G2G3/(No ranking assigned for Montana because previously this type has been recognized only as ARTTRI/AGRSMI [G5/S5])

Artemisia tridentata ssp. *tridentata/Festuca idahoensis* community type
(ARTTST/FESIDA; big sagebrush/Idaho fescue)

Environment- This type is found on moist lower slopes or short slopes at 6,600-7,200 ft in the Tendoy Mountains and repeats in the Centennial Sandhills as the late seral stage of stabilized dune sands. Adjacent less mesic sites are dominated by *Artemisia tridentata vaseyana* and *Festuca idahoensis*. Moister sites with finer textured soils support *Artemisia tridentata tridentata* with an understory dominated by *Agropyron smithii* and/or *Elymus cinereus*.

Vegetation- *Artemisia tridentata tridentata* is the dominant shrub with 10-20% canopy cover. *Chrysothamnus* spp. and *Tetradymia canescens* are present in many stands. Grass canopy cover is 50-70%. *Festuca idahoensis* dominates, and *Agropyron spicatum* is also common. Forb cover is generally ca. 10% with moderate diversity. *Astragalus adsurgens*, *Penstemon aridus* and *Senecio canus* are often present. Mosses and lichens may be common.

Soils- Soils are deep and silty or loamy in texture; the Centennial Sandhills composed of aeolian sand to loamy sands constitute a rather unique substrate. From 10 to 20% of the surface is bare, and surface gravel is usually present, with the exception of the Centennial Sandhills representatives of the type.

Other Studies- Mueggler and Stewart (1980) do not mention that *Artemisia tridentata tridentata* may occur with *Festuca idahoensis* in Montana. Similar vegetation is reported for Idaho, Oregon and Washington (Bougeron and Engelking 1992).

Natural Heritage Program Rank- G3G4/SP

Artemisia tridentata ssp. *tridentata/Stipa comata* community type
(ARTTST/STICOM; big sagebrush/needle-and-thread)

Environment- ARTTST/STICOM is endemic to stabilized sand dunes in the Centennial Valley at 6,600-6,700 ft. Adjacent blowouts support STICOM/PSOTEN as a seral community type.

Vegetation- *Artemisia tridentata tridentata* is the dominant shrub with 10-30% canopy cover. *Chrysothamnus* spp. are present in many stands. Grass canopy cover is ca. 40-70% with *Stipa comata*, *Festuca idahoensis*, or *Agropyron dasystachyum* sharing dominance, depending on how successionally far advanced the stand is. Forbs have 10-30% cover and moderate to high diversity. *Opuntia fragilis, Lupinus argenteus, Comandra umbellata* and *Artemisia dracunculus* may be common. Mosses and lichens are absent.

Soils- Soils are deep and sandy. Gravel and rock are absent. 40-60% of the soil surface is bare.

Other Studies- Vegetation dominated by *Artemisia tridentata* ssp. *tridentata* and *Stipa comata* is reported for Idaho, Washington and Oregon (Bougeron and Engelking 1992). This type occurs at low elevations in Washington and common forbs are very different than those of the Montana type (Daubenmire 1970).

Comments- This type might be considered a seral stage of ARTTST/FESIDA or an edaphic phase of this type. However, it appears to be stable over long time periods and has different soil, forb and bryophyte components than typical ARTTST/FESIDA.

The relationship between this type and the closely related *Stipa comata* phase of ARTTRP/FESIDA is unclear. Both are found in apparently similar habitats. Fire and/or grazing may play a role in maintaining these different association in the Centennial Sandhills landscape.

Natural Heritage Program Rank- G5/S4 (This rank applied explicitly to *A. tridentata/Stipa comata* c.t. with no

variety of *A. tridentata* specified)

Artemisia tridentata ssp. *vaseyana/Elymus cinereus* community type
(ARTTSV/ELYCIN; mountain big sagebrush/basin wildrye;
WHTF designation *Artemisia tridentata* ssp. *vaseyana/Leymus cinereus*)

Environment- Gentle to moderate slopes and terraces with warm aspects, deep soils and mesic moisture regimes may support examples of ARTTSV/ELYCIN. Stands occur at 6,900-7,200 ft or higher in the Red Rock River drainage. Slightly drier sites support ARTTSV/FESIDA, while cooler sites are dominated by *Pseudotsuga menziesii* or *Pinus flexilis* forests. Adjacent rocky slopes support *Cercocarpus ledifolius* woodlands.

Vegetation- *Artemisia tridentata vaseyana* is the dominant shrub with 20-30% canopy cover. *Artemisia tripartita, Tetradymia canescens* and *Chrysothamnus* spp. are often present but not common. Grass cover is 70-90%. Dominant grasses are *Elymus cinereus* and *Festuca idahoensis. Agropyron caninum, A. dasystachyum* and *Bromus carinatus* may be common in some stands. *Poa pratensis* occurs in stands that have been heavily grazed. Forbs have 10-20% cover, but diversity is only low to moderate. *Achillea millefolium, Cirsium spp., Erysimum inconspicuum* and *Potentilla gracilis* are present in many stands. Mosses may be common in some stands.

Soils- Soils are deep with a loamy or silty in texture and are often derived from alluvium. Some sites may be slightly saline. Bare ground and surface gravel are uncommon.

Other Studies- This type has been described for Idaho (Bougeron and Engelking 1992).

Comments- This type might also be considered a mesic phase of ARTTSV/FESIDA. At this time the successional relationships of *Festuca idahoensis* and *Elymus cinereus* are not clear. Heavy spring or early summer grazing probably results in a decrease of *E. cinereus*, while light summer grazing may favor this species. Although this type is now confined to very mesic sites, it may not have been so restricted prior to introduction of livestock.

Natural Heritage Program Rank- G4/(No previous description of this c.t. for MT thus need for further inventory before ranking)

Artemisia tridentata ssp. *vaseyana/Festuca idahoensis* community type
(ARTTSV/FESIDA; mountain big sagebrush/Idaho fescue)

Environment- ARTTSV/FESIDA is common on slopes and upper terraces at 6,000-8,500 ft throughout the study area. Parent materials included limestone, quartzite, volcanic, igneous and alluvium. Adjacent cooler slopes support *Pseudotsuga menziesii* or *Pinus flexilis* forests. Sites with shallow soil are often dominated by *Cercocarpus ledifolius*. Nearly level sites of terraces with finer textured soils may be dominated by *Artemisia tridentata tridentata.*

Vegetation- *Artemisia tridentata vaseyana* is the dominant shrub with canopy cover of 10-70%. *Chrysothamnus viscidiflorus* is the only other frequent and common shrub. Grass cover is generally high. *Festuca idahoensis* is the dominant grass with mean canopy cover of 48%. Other common grasses are *Agropyron spicatum* and *Koeleria cristata.* Forbs are generally abundant, and diversity is moderate to high. Common species include *Achillea millefolium, Antennaria microphylla, Besseya wyomingensis, Eriogonum umbellatum, Geum triflorum* and *Taraxacum officinale.* Mosses are uncommon in most stands. Particularly mesic sites at higher elevations have robust grasses such as *Bromus carinatus* and *Agropyron dasystachyum* and higher coverages of mesic forbs such as *Geranium viscosissimum, Galium boreale, Geum triflorum* and *Potentilla gracilis.*

Soils- Soils have a loamy texture and are generally deep. Up to 30% of the ground may be bare. Gravel is uncommon or absent.

Other Studies- Mueggler and Stewart (1980) describe this type for western Montana. Similar vegetation has been reported for all states in the Northern Rocky Mountains and intermountain states (Bougeron and Engelking 1992). Mueggler and Stewart (1980) discuss how these associations differ from those in Montana.

Comments- Mesic stands supporting an abundance of robust grasses and forbs is considered the *Geranium viscosissimum* phase of the type (Mueggler and Stewart 1980).

Elk and mule deer are common in these habitats. Pocket gophers are evident in some stands.

Natural Heritage Program Ranking- G4/(No MT listing for the *vaseyana* varietal epithet, but at the species level is S4)

Artemisia tridentata ssp. *vaseyana/Agropyron spicatum* community type

(ARTTSV/AGRSPI; mountain big sagebrush/bluebunch wheatgrass;
WHTF designation *Artemisia tirdentata* ssp. *vaseyana/Pseudoroenegria spicata*)

Environment- This type is common on steep slopes or occasionally ridges or terraces at 5,000-6,000 ft on the east slopes of the Pioneer Mountains and the Block Mountain area; it was noted in reconnaissance in the Tendoy Range on south-facing slopes. Common associated parent materials are basalt, quartzite or mixed sedimentary. Adjacent shallower, rocky soils are dominated by *Cercocarpus ledifolius*. Adjacent terraces are dominated by *Artemisia tridentata tridentata* and *Agropyron smithii*.

Vegetation- *Artemisia tridentata* ssp. *vaseyana* is the dominant shrub with 10-40% canopy cover. Scattered *Chrysothamnus nauseosus* plants are usually present. The subshrubs, *Artemisia frigida* and *Gutierrezia sarothrae* are common in most stands. Grass canopy cover is generally 40-70%. *Agropyron spicatum* is the dominant species; *Stipa comata, Bouteloua gracilis* and *Poa secunda* are other common species. Forb canopy cover is 10-30%, and diversity is low to moderate. *Opuntia polyacantha, Phlox muscoides* and *Erigeron compositus* are common species. Mosses and lichens are often common.

Soils- Soils have a loamy or sandy clay texture. The surface may be as much as 20% bare, but rock and gravel account for up to 70% cover.

Other Studies- Mueggler and Stewart (1980) describe this type for western Montana. Similar communities have been reported for most of the Northern Rocky Mountains and intermountain states (Bougeron and Engelking 1992). Mueggler and Stewart (1980) discuss how the types described from different areas differ.

Comments- Most of the country south of Horse Prairie Creek may be too high to support extensive stands of this type.

Natural Heritage Program Rank- G4/(No MT listing for the *vaseyana* varietal epithet but at the species level rated S5)

Artemisia nova/Agropyron spicatum community type
(ARTNOV/AGRSPI; black sagebrush/bluebunch wheatgrass;
WHTF designation *Artemisia nova/Pseudoroegneria spicata*)

Environment- This type is common on gentle to steep slopes, alluvial fans and terraces in areas of calcareous parent material; generally it is present on slopes with south- or west-facing aspects. It is found in the Tendoy Mountains north to Badger Pass at 5,500-7,200 ft. Adjacent rockier soils are dominated by *Cecocarpus ledifolius* or *Pinus flexilis*. Deeper soils are dominated by *Artemisia tridentata vaseyana* or *A. t. tridentata* and *Festuca idahoensis, Agropyron spicatum* or *A. smithii*.

Vegetation- *Artemisia nova* is the dominant shrub with coverages up to 40%. *Chrysothamnus nauseosus* is usually common. Common subshrubs include *Artemisia figida* and *Gutierrezia sarothrae*. *Agropyron spicatum* is well represented and usually the dominant grass with canopy cover of 10-40%. *Stipa comata* and *Oryzopsis hymenoides* are highly constant but generally are not even well represented. Forb cover is sparse, but diversity is moderate. *Opuntia polyacantha, Phlox hoodii, Stephanomeria runcinata, Erigeron tweedyi* and *Penstemon aridus* are often present. Mosses are absent, and lichens are rare.

Soils- Soils have a silty or sandy texture and are usually stony, shallow and derived from calcareous parent material. Up to 80% of the ground may be bare or covered with gravel or rock.

Other Studies- Mueggler andStewart (1980) first described this type for western Montana as *Artemisia arbuscula/Agropyron spicatum*, lumping the *nova* and *arbuscula* subspecies of *A. arbuscula*. Various authors have subsequently recognized the distinct ecologies, if not taxonomy, of these taxa. Similar vegetation has been reported for Oregon, Nevada, Idaho, Colorado and Wyoming (Bougeron and Engelking 1992).

Comments- There has been a good deal of confusion surrounding the taxonomic nomenclature of the low sagebrushes *Artemisia nova, A. arbuscula* and *A. longiloba* in Montana. Cronquist (Hitchcock and Cronquist 1973) places all three taxa under *A. arbuscula*. Schulz (1984) recognizes *A. nova* as a distinct species, but places *A. longiloba* as a subspecies of *A. arbuscula*. Beetle (1982) recognizes all three as separate species. This variable nomenclature has caused confusion in the vegetation classification literature.

The closely related *Artemisia nova/Festuca idahoensis* c.t. also occurs in southwest Montana, but we failed to sample any stands.

Natural Heritage Program Rank- G5/S4

Cercocarpus ledifolius/Festuca idahoensis Community Type
(CERLED/FESIDA; mountain mahogany/Idaho fescue)

Vegetation- *Cercocarpus ledifolius* and *Agropyron spicatum* are abundant. *Festuca idahoensis* cover generally exceeds 5%. Other species that are generally present with cover exceeding 1% include *Artemisia frigida, A. tridentata, Opuntia polyacantha*, and *Poa sandbergii*. *Bromus tectorum* may be abundant where surface disturbance has occurred through grazing.

Environment- The type occurs on steep residual mountain slopes at elevations around 6000 feet. The total cover of soil, gravel, and rock usually exceeds 40% and the soil sur-face is stable with no evidence of accelerated erosion.

Parent materials are granitic and soils are Ustorthents and are moderately deep and very cobbly. Textures vary from loamy sands to sandy loams. The soils are non-calcareous and their available water holding capacities are low due

to the coarse soil textures and abundant coarse fragments.

Adjacent Communities- The *Cercocarpus ledifolius/Festuca idahoensis* and *C. ledifolius/Agropyron spicatum* types are ecologically similar and intergrade. Of the two types, *C. ledifolius/A. spicatum* occurs in slightly more xeric situa-tions. The *Pseudotsuga menziesii/F. idahoensis* type may be found on adjacent more mesic sites that are less rocky and have deeper soils.

Other Studies- This type has not been previously described anywhere in the U.S.

Natural Heritage Proram Rank- G2?/S2

Cercocarpus ledifolius/Agropyron spicatum c.t.
(CERLED/AGRSPI; mountain mahogany/bluebunch wheatgrass;
WHTF designation *Cercocarpus ledifolius/Pseudoroegneria spicata*)

Environment- Mountain mahogany woodlands often dominate on steep, rocky-gravelly slopes, usually with warm, southeast- through west-facing aspects at 5,400-7,900 ft throughout the study area; these conditions are usually found on upper and shoulder positions of ridge and hill slopes. Adjacent cool slopes may support *Pseudotsuga menziesii* or *Pinus flexilis* forests. Adjacent warm slopes with deeper soils/less rock are dominated by the grasses *Festuca idahoensis* and *Agropyron spicatum* with or without *Artemisia tridentata vaseyana* or *A. tripartita.* Many stands grade into barren rock outcrops or talus slopes.

Vegetation- Stands are dominated by *Cercorpus ledifolius* with canopy cover of 10-60% with a mean of 30%. *Artemisia tridentata vaseyana* and *Chrysothamnus viscidiflorus* are often common. *Juniperus scopulorum* occurs in about half of the stands with a mean cover of 6% but its presence cannot be convincingly linked to particular habitat conditions or stand history. The subshrub, *Artemisia frigida,* is present in most stands. Grass cover is sparse. *Agropyron spicatum* and *Oryzopsis hymenoides* are the herbs with the highest constancy; the presence of either as common is diagnostic for the type. *Poa secunda* and *Stipa comata* are present in many stands. Forb cover is low but diversity is often moderate to high. No species occurred in even half of the sampled stands. *Achillea millefolium, Opuntia polyacantha* and *Taraxacum officinale* were the only species with constancy higher than 25%. Mosses are present in most stands, and lichens are occasionally found.

Soils- Textures are sandy to sandy loam. An average of greater than 65% of the soil surface is bare or covered with rock or gravel. As Mueggler and Stewart (1980) suspected this type is not confined to calacareous substrates but is often found on these substrates because they weather to the appropriate rocky-gravelly substrate; this type was also found on granitics, extrusive volcanics and quartzite.

Other Studies- Mueggler and Stewart (1980) describe this type for western Montana; however, their sampling was limited to calcareous parent materials. Similar vegetation has been described for Idaho (Schlatterer 1972, Lewis 1975, Scheldt and Tisdale 1970). Vegetation with the same dominants has been reported for Colorado, Utah, Nevada and Wyoming (Bougeron and Engelking 1992).

Comments- Stands with *Juniperus scopulorum* have sometimes been segregated as a separate type (Bougeron and Engelking 1992); however, we could find no consistent habitat or floristic differences between these two putative types in our study area, and indirect gradient analysis did not separate them. There is a tendency for *J. scopulorum* to be present only non-calcareous sites.

The presence of large quantities of pellets and strongly hedged *C. ledifolius* indicates that this vegetation type is very important for deer, particularly as winter range.
Natural Heritage Program Rank- G5/S4

Artemisia tridentata ssp. *wyomingensis/Agropyron dasystachyum* community type
(ARTTSW/AGRDAS; Wyoming big sagebrush/thick-spike wheatgrass;
WHTF designation *Artemisia tridentata* ssp. *wyomingensis/Elymus lanceolatus*)

Environment- This type occurs on gently sloping alluvial fans and terraces. Our single example was from 6,650 ft, but ARTTSW/AGRDAS might be expected to occur at 5,000-7,500 ft. Adjacent stands on heavier soils with poorer drainage are dominated by *Artemisia longiloba* and *Agropyron dasystachyum* or *Elymus cinereus* and *Poa juncifolia*. Adjacent slopes with deeper soils may support stands dominated by *Artemisia tridentata vaseyana* and *Festuca idahoensis* or *Agropyron spicatum* .

Vegetation- *Artemisia tridentata wyomingensis* is the dominant shrub. *Chrysothamnus* spp. may also be present. The subshrub, *Artemisia frigida*, is usually common. Grass canopy cover is moderate to high and dominated by the midgrass species, *Agropyron dasystachyum* and *Stipa viridula*. *Poa cusickii* and *P. secunda* may also be present. Forb cover is low, and diversity is low to moderate. *Phlox hoodii* and *Astragalus adsurgens* are common species. Mosses and lichens are uncommon.

Soils- Soils are fine-textured. Much of the soil surface is bare, and surface gravel is uncommon.

Other Studies- Jorgensen (1979) describes vegetation dominated by *Artemisia tridentata wyomingensis* and *Agropyron dasystachyum* in central Montana. This type, or a very similar analogue, is reported for Wyoming and Colorado as *Artemisia tridentata* var *wyomingensis* /Elymus lanceolatus var *albicans* (Bougeron and Engelking 1992).

Comments- *Agropyron dasystachyum* and *A. smithii* have overlapping habitat requirements throughout much of Montana (see Coupland 1961 and Jorgensen 1979). In much of Montana the two types, ARTTSW/AGRSMI and ARTTSW/AGRDAS may be indistinguishable except for different dominant rhizomatous wheatgrasses.

Natural Heritage Program Rank- G3/S3 (for the *A. tridentata/A. dasystachyum* c.t., no Montana listing for *A. tridentata* ssp. *wyomingensis/Elymus lanceolatus* ssp. *albicans* but this is a major type in Wyoming G4/S4)

Artemisia tridentata ssp. *wyomingensis/Agropyron spicatum* community type
(ARTTSW/AGRSPI; Wyoming big sagebrush/bluebunch wheatgrass;
WHTF designation *Artemisia tridentata* ssp. *wyomingensis/Pseudoroegneria spicata*)

Environment- Gently sloping alluvial fans and terraces may support stands of ARTTSW/AGRSPI. The single sample stand was at 7,400 ft, but this type might be expected to occur at 5,000-7,500 ft. Adjacent stands on heavier soils with poorer drainage are dominated by *Artemisia longiloba* and *Agropyron dasystachyum* or *Festuca idahoensis* or *Elymus cinereus* and *Poa juncifolia*. Adjacent slopes with deeper soils may support stands dominated by *Artemisia tridentata vaseyana* and *Festuca idahoensis*.

Vegetation- *Artemisia tridentata* ssp. *wyomingensis* is the dominant shrub with a cover of at least 10%; in the course of reconnnaissance cover was noted to vary from 5-10% (in the establishment phase) to 30 plus % in stands heavily impacted by grazing. *Chrysothamnus* spp. may also be present. Grass cover may be as high as 60%, and *Agropyron spicatum* is the dominant species. *Poa secunda* and *Koeleria cristata* are other high constancy grasses; with light grazing they are poorly represented but increase somewhat in proportion to increasing grazing pressure. Common forbs include *Phlox hoodii* and *Antennaria microphylla*. Mosses and lichens are uncommon or absent.

Soils- Soils are silty in texture. Much of the surface is bare, and surface gravel is common.

Other Studies- Vegetation dominated by *Artemisia tridentata wyomingensis* and *Agropyron spicatum* is described

for western Montana by Mueggler and Stewart (1980) who do not differentiate between subspecies *wyomingensis* and *vaseyana*. Jorgensen (1979) describes this type for central Montana. This type has also been reported for Washington, Oregon, Nevada, Idaho, Wyoming and Colorado (Bougeron and Engelking 1992).

Comments- Subspecies *vaseyana* appears to be more common than subsp. *wyomingensis* in the high country of southwest Montana. We expect subsp. *wyomingensis* to be common only in the more windswept or otherwise arid sites where subsp. *vaseyana* is excluded.

Natural Heritage Program Rank- G5/(No MT listing for the *wyomingensis* varietal epithet however, at the species level this c.t. is rated S5)

Artemisia tripartita/Festuca idahoensis community type
(ARTTRP/FESIDA; Three-tip sagebrush/Idaho fescue)

Environment- This type is common on gentle to moderate slopes and ridges at 6,300-7,500 ft in the drainage of the Red Rock River. The *Stipa comata* phase is common on the stabilized sandhills at 6,600-6,700 ft at the northeast end of the Centennial Valley. Soils are derived from many different parent materials. Finer textured soils of adjacent terraces support ARTTRP/AGRDAS, while steeper, higher or cooler slopes are dominated by *Artemisia tridentata vaseyana* and *Festuca idahoensis*. The *Stipa comata* phase of ARTTRP/FESIDA occupies the most stabilized dunes in the Centennial Valley; less stable areas support STICOM/PSOTEN.

Vegetation- *Artemisia tripartita* is the dominant shrub with canopy cover of 10-30%. *Artemisia tridentata* ssp. *vaseyana, Chrysothamnus viscidiflorus* and *Tetradymia canescens* are often present. Total grass cover is generally high, 60-80% in most stands. *Festuca idahoensis* is usually the dominant species, but *Agropyron dasystachyum, A. spicatum* and *Koeleria cristata* are also common. *Stipa comata* is common and its dominance defines the *Stipa comata* phase. Forb canopy cover and diversity are moderate. Common forbs are *Achillea millefolium, Antennaria microphylla, Geum triflorum, Comandra umbellata, Lupinus sericeus, Phlox hoodii* and *Taraxacum officinale*. Mosses and lichens may be present but are uncommon.

Soils- Soils have a silty or loamy texture. Usually less than 30% of the surface is bare, and gravel is uncommon. The *Stipa comata* phase occurs on sandy soils with no surface gravel.

Other Studies- Daubenmire (1970) first described *Artemisia tripartita/Festuca idahoensis* as a zonal climax plant association for eastern Washington, but many of the common subordinate species are different from those of our study area. .Mueggler and Stewart (1980) were the first to document this type for southwestern Montana. Similar vegetation has been described for Idaho (Hironaka 1977) and vegetation dominated by these two species is also reported for Colorado (Bougeron and Engelking 1992).

Comments- The *Stipa comata* phase occurs on sandy rather than silty or loamy soils and is characterized by having *Stipa comata* rather than *Agropyron dasystachyum* or *A. spicatum* as important subordinate grasses. See Comments under ARTTST/STICOM.

Mueggler and Stewart (1980) imply that stands dominated by *Artemisia tripartita* may occur on sites that are drier than optimum for *A. tridentata vaseyana*. This hypothesis is supported by our observation that *A. tridentata vaseyana* stands are often on cooler or higher slopes. Capable of root sprouting as a reproductive tactic, *Artemisia tripartita* also resprouts after fire, while *A. tridentata* is killed, so fire history may play a role in determining the distribution of these plants across the landscape. Nonetheless, it is difficult to assign distinct ecological niches to these two sagebrush species.

Natural Heritage Program Rank- G3/S3?

Artemisia tripartita/Agropyron dasystachyum community type
(ARTTRP/AGRDAS; three-tip sagebrush/thickspike wheatgrass;
WHTF designation *Artemisia tripartita/Elymus lanceolatus*)

Environment- This type is found on nearly level slopes of stream terraces and alluvial fans at ca. 6,500-6,700 ft in the Centennial Valley. Vegetation of lower positions in the landscape tends to be wetlands dominated by *Juncus balticus* or *Deschampsia cespitosa*. ARTTRP/FESIDA is the most common type on adjacent slopes or better drained positions with coarer-textured soils.

Vegetation- *Artemisia tripartita* is the dominant shrub with canopy cover of 10-20%. *Chrysothamnus nauseosus* and *C. viscidiflorus* are common in most stands. Grass cover is 40-60%. *Agropyron dasystachyum* is usually the dominant grass. Small cespitose bluegrasses, such as *Poa juncifolia, P. secunda* and *P. cusickii*, are often common. Forb cover is ca. 10%, and diversity is low. *Phlox hoodii, Antennaria microphylla* and *A. parvifolia* are common species. Mosses and lichens are absent.

Soils- Soils are deep and silty in texture. Some sites may be slightly saline. 40-70% of the soil surface is bare, and gravel is uncommon.

Other Studies- This type has not been previously described.

Comments- Examples of this unusual vegetation have been heavily grazed by livestock in the past, probably obscuring the actual potential vegetation of these sites. Vegetation dominated by *Artemisia tripartita* and *Elymus cinereus* is reported for Idaho (Bougeron and Engelking 1992), and a type dominated by *A. tripartita* and *Stipa comata* occurs in Washington (Daubenmire 1970). ARTTRP/AGRDAS may be a seral stage of vegetation similar to one of these types. A possible scenario envisions these sites as seral to *A. tridentata* ssp. *tridentata* (or *vaseyana*), quite possibly the ARTTRT/*Leymus cinereus* or ARTTRT/*Pascopyrum smithii* c.ts.

Natural Heritage Program Rank- (No ranking until further fieldwork conducted)

Artemisia tripartita/Agropyron spicatum community type
ARTTRP/AGRSPI; three-tip sagebrush/bluebunch wheatgrass;
(WHTF designation *Artemisia tripartita/Pseudoroegneria spicata*)

Environment- This is a community of very limited acreage in the Dillon R.A., noted only south of the Clark Fork Reservoir, almost always occuring in small or linear patches on west- to south-facing ridges and convex slope shoulders; sites where solar insolation and prevailing winds exceed the tolerance of *Festuca idahoensis*. These sites usually have an abrupt transition to ARTTRP/FESIDA or ARTTSV/FESIDA of less moisture-stressed positions.

Vegetation- These droughty sites barely have sufficient cover (10-20%) of *Artemisia tripartita* to be considered shrub stands. Other shrubs that occur, generally with less than 5% cover, include *Chrysothamnus viscidiflorus, Artemisia frigida* and *Artemisia tridentata* var. *vaseyana*. The herbceous layer is dominated by *Agropyron spicatum* and *Koeleria cristata*, though their coverages commonly don't exceed 30%. Forbs often include *Phlox hoodii, Achillea millifolium, Antennaria parviflora, A. microphylla* and *Erigeron compositus*; none having more than 5% cover.

Soils- Generally there is more than 70% exposed substrate (including soil, gravel and rock) and litter is confined to the immediate vicinity of shrub and bunchgrass canopies. Parent materials include extrusive volcanics and alluvial outwash.

Other Studies- ARTTRP/AGRSPI was first described by Daubenmire (1970) for portions of the Columbia Basin

where it occurs in much the same manner it does within the Centennial Valley, as isolated patches typifying hot, dry exposures within what is ARTTRP/FESIDA dominated climatic climax. It apparently is most extensive southward in Idaho's Snake River Plain and also occurs as an uncommon type in Oregon and Washington (Bourgeron and Engelking 1994).

Comments- Within the Centennial Valley ARTTRP/AGRSPI we speculate to be a successional community type, seral to ARTTSV/AGRSPI. We noted, but did not sample, several small stands with mixed *A. tridentata* ssp. *vaseyana* and *A. tripartita* and occurring in the same landscape positions as ARTTRP/AGRSPI. The severity of these sites may slow the rate at which *A. tridentata* ssp. *vaseyana* recolonizes and ultimately replaces *A. tripartita* (in the absence of fire).

Natural Heritage Program Rank- G3/S2? (ARTTRP/AGRSPI has not been previously described from Montana.)

Chrysothamnus viscidiflorus/Stipa comata community type
(CHRVIS/STICOM; green rabbitbrush/needle-and-thread)

Environment- The CHRVIS/STICOM c.t. has been found only on the Centennial Sandhills as a putative seral stage to the ARTTSV/FESIDA or ARTTST/STICOM community types. CHRVIS/STICOM apparently represents a relatively early stage in the colonization of sandy substrates that have blownout (lost their original vegetation cover leaving a raw substrate). It can occur in any position in this dune system but most often was noted in drier exposures of upslope positions because these are the locations most often subject to disturbance.

Vegetation- Total vegetative cover on these sites is generally low, not exceeding 30%, with *Chrysothamnus viscidiflorus* dominant and other shrubs, *Tetradymia canescens*, *Chrysothamnus nauseosus* and *Leptodactylon pungens*, scattered. The forb layer is dominated by Stipa comata or Agropyron dasystachyum, Opuntia polyacantha, Psoralea tenuiflora, and Phacelia hastata, but none are even well represented, the combined forb cover being less than 15%.

Soils. The substrate is fine-textured sand with more than 90% exposed and only a trace of litter. There is no evidence of soil development with the exception of a trace of organic matter darkenign the surface.

Other Studies- There is no comparable community type listed for the western United States and only one type (in Utah) wherein *Chrysothamnus viscidiflorus* is the diagnostic species (CHRVIS/*Leymus salinus* ssp. *salinus*; Bourgeron and Engelking 1994).

Natural Heritage Program Rank- G?/S? (Currently unranked pending further inventory.)

Sarcobatus vermiculatus/Distichlis stricta community type
(SARVER/DISSTR; greasewood/saltgrass)

Environment- This uncommon type is found on wide stream terraces and lower alluvial fans often in areas of calcareous parent material such as the Centennial Valley. Higher terraces with less saline soil may support stands dominated by *Sarcobatus vermiculatus* or *Artemisia tridentata tridentata* and *Agropyron smithii* or *Elymus cinereus*. Nearby slopes are dominated by *Artemisia tridentata* or *A. tripartita* and *Agropyron spicatum* or *Festuca idahoensis*.

Vegetation- *Sarcobatus vermiculatus* is the dominant shrub although canopy cover is often less than 10%. *Artemisia tridentata tridentata* and *Chrysothamnus nauseosus* are also often present. The ground layer is dominated by halophytic grasses including *Distichlis stricta, Puccinellia distans*, and/or *Poa juncifolia*. Forbs are

uncommon, and diversity is low. *Lepidium densiflorum, Haplopappus uniflorus* and *Antennaria microphylla* may be present. Mosses and lichens are absent.

Soils- Soils are silty and deep. The surface horizons are saline. Most of the soil surface is bare, and gravel is absent.

Other Studies- Mueggler and Stewart (1980, p. 76) state that they have reason to believe that this type occurs in western Montana, but they do not describe it. Similar vegetation has been described for eastern Washington (Daubenmire 1970), Colorado, Idaho and Oregon (Bougeron and Engelking 1992).

Comments- SARVER/DISSTR and SARVER/AGRSMI are similar types; this type might also be considered a saline phase of the SARVER/AGRSMI c.t. (see Comments under SARVER/AGRSMI).

Natural Heritage Program Rank- G4/S2

Sarcobatus vermiculatus/Agropyron smithii community type
(SARVER; greasewood/western wheatgrass;
WHTF designation *Sarcobatus vermiculatus/Pascopyrum smithii*)

Environment- This uncommon type is found on wide stream terraces, often in areas of calcareous parent material such as the Tendoy Mountains. Higher terraces with less alkaline-saline soil may support stands dominated by *Artemisia tridentata tridentata* and *Agropyron smithii* or *Elymus cinereus*. Nearby slopes are dominated by *Artemisia tridentata* and *Agropyron spicatum* or *Festuca idahoensis*.

Vegetation- *Sarcobatus vermiculatus* is common with ca. 10% canopy cover. It or *Artemisia tridentata tridentata* is the dominant shrub. The subshrub, *Artemisia frigida*, may also be common. *Agropyron smithii* and/or *A. dasystachyum* are the dominant and diagnostic species, often forming a thin sword. Forbs are scarce. *Opuntia polyacantha* or *Taraxacum officinale* may be present. Soil lichens or algae may be present.

Soils- Soils are silty and deep. The surface horizons are usually alkaline-saline. Most of the soil surface is bare, but gravel is rare or absent.

Other Studies- Mueggler and Stewart (1980) describe this type for western Montana, and Hansen et al. (1991) describe it mainly for eastern Montana. Jorgensen (1979) described a similar *Sarcobatus vermiculatus/Agropyron dasystachyum* type from central Montana. SARVER/AGRSMI is also reported from Wyoming (Bougeron and Engelking 1992). A very similar type dominated by *Sarcobatus vermiculatus, Elymus cinereus* and *Agropyron smithii* has also been described for western Montana (Mueggler and Stewart 1980).

Comments- Although Mueggler and Stewart (1980) state that *Poa juncifolia* decreases with grazing, we believe that under late season grazing it may increase, while rhizomatous wheatgrasses decrease. Mueggler and Stewart (1980) indicate an inability to distinguish environment differences between SARVER/ELYCIN and SARVER/PASSMI; the differences could be more attributable to grazing history than habitat. Most examples of this vegetation (SARVER/PASSMI) are close to water and on nearly level terrain. Consequently most stands have been severely impacted by livestock grazing. *Elymus cinereus* may have been present in many of these stands prior to the heavy livestock grazing in the early part of the century (see Comments under ELYCIN/PUCDIS).

Natural Heritage Program Rank- G4/S4

Atriplex nuttallii/Oryzopsis hymenoides Community Type
(ATRNUT/ORYHYM; Nuttall saltbush/Indian ricegrass;
WHTF designation *Atriplex gardneri/Oryzopsis hymenoides*)

Environment- The type occurs on steep badland sites at elevations around 5000 feet. Bare soil cover totals at least 60% and most of the remaining ground cover is comprised of coarse fragments. The soil surface is unstable because of a lack of adequate vegetation cover and gully erosion is common.

Parent materials are sedimentary rocks and soils are very shallow and poorly developed. Soils range from not gravelly to very gravelly and are non-calcareous. Textures are gener-ally very fine (e.g., silty clay loams) and available water holding capacity is low.

Vegetation- Total vegetation cover in this badlands type seldom exceeds 5%. Characteristic species include *Atriplex nuttallii*, *Chrysothamnus nauseosus*, and *Oryzopsis hymenoides*.

Adjacent Communities- Vegetation on adjacent more stable soils include the *Artemisia tridentata/Agropyron spicatum* type on non-alkaline soils and the *Sarcobatus vermiculatus/Agropyron smithii* type on alkaline soils.

Other Studies- This type has not previously been reported in Montana but has been reported in Colorado and is listed as questionably present in Oregon and Wyoming (Bourgeron and Engelking 1991).

Natural Heritage Program Rank- G3/S3

Salix planifolia/Carex nebraskensis community type
(SALBPL/CARNEB; planeleaf willow/Nebraska sedge)

Environment- SALPLA/CARNEB is a minor community type, generally occurring as small(<1 acre) patches in the Centennial Valley vicinity on flat or gently sloping meadows and on lower slopes with a variety of aspects. The high water tables found in SALPLA/CARNEB result from lateral subirrigation though in several instances this type was noted to be associated with fluvial conditions as narrow stringer of small, first order streams. This community is usually is the moistest on the local moisture gradient and grades to *Deschampsia cespitosa-*, *Poa pratensis-* or *Juncus balticus-* dominated c.ts. of drier positions or more usually abruptly gives way to the *Artemisia tridentata* ssp. *vaseyana* or *Artemisia tripartita/Festuca idahoensis* c.t.

Vegetation- Shrub dominance on sampled occurrences varied between *Salix brachycarpa* and *S. planifolia* (ssp. unknown due to inopportune sampling time) and both species and *Potentilla fruticosa* were noted to be present in most stands, but coverages never exceeded 20%. (see comments). The dominant aspect of these stands is a solid sward of mid-height graminoids, *Carex nebraskensis*, *Carex praegracilis*, *C. simulata*, *Calamagrostis stricta*, *Deschampsia cespitosa* and *Juncus balticus*; only the first thee named are abundant. Well represented *Pedicularis groenlandica* is the dominant forb and *Senecio sphaerocephalus*, *Aster occidentalis* and *Sisyrinchium angustifolium* are frequently present, often well represented. Basal area of graminoids and about 10% litter account for the 20% of the ground that is not a carpet of bryophytes.

Soils- The upper 10-20 cm of profiles have at least 50% fibrous to histic organic matter and the remainder is a silty or clayey mineral material; in one case the minerl material was a 3 cm. thick layer intercalated between two histic organic layers. Soils were saturated to the surface in late July.

Other Studies- This description should be considered preliminary as this exact community type has not been described elsewhere; in fact, a misidentification of *Salix* spp. on our part could place it with any number of *Salix*-dominated community types with *C. nebrascensis* as a dominant undergrowth component. Youngblood et al. (1985)

describe a *Salix planifolia* c.t. of "low elevations" in the Centennial Range and Yellowstone Plateau and note the undergrowth is dominated by *Carex rostrata* and *Juncus balticus* which would give their type a high resemblance to the type described here.

Comments- Judging by the intensive hedging of the *Salix* species (mature specimens not over 2 dm when potential is 1m plus) in these and adjacent *Salix*-dominated stands we surmise the wild ungulate pressure to be intensive on these sites. Some hummocking, is present but not enough to create difficult walking. Cattle use has not yet markedly altered composition (potential for creating *Poa pratensis*- and *Juncus balticus*-dominated stands).

Natural Heritage Program Rank- (Newly described plant association; ranking not assigned pending further consultation with area ecologists)

Salix exigua Community Type
(SALEXI; sandbar willow)

Environment- This type occurs on gravelly alluvial parent materials on flat flood plains and terraces in wide valley bottoms. Elevations are between 5000 and 5500 feet. Litter plus wood cover equals or exceeds 60% of the ground surface and soil cover is typically around 20%. The soil surface is unstable because of a lack of adequate vegetation cover and the active fluvial disturbance regime present on *S. exigua* sites.

Vegetation- *Salix exigua* dominates the overstory (often with a total canopy cover of 100%). The undergrowth is typically very depauperate due to the intense competition with *S. exigua* and seldom exceeds 5% total cover. Species that are often present in this sparse undergrowth include *Cirsium arvense*, *Mentha arvensis*, and *Phalaris arundinacea.*

Soils- Soils are often Aquic Udifluvents, are very deep with sandy textures, have a low available water holding capacity, and are non-calcareous. Coarse fragment contents vary from gravelly to very cobbly.

Adjacent Communities- Adjacent wetter sites are often open water. Adjacent drier riparian communities often feature the *Populus trichocarpa/Cornus stolonifera* type.

Other Studies- This type has been described as ubiquitous and abundant in Montana by Hansen et al. (1991); it is reported for the northwest, where it is comparatively rare, by Kovalchik (1987)and as far to the southeast as Colorado (Kittel and Lederer 1993).

Natural Heritage Program Rank- G5/S5

Deschampsia cespitosa community type
(DESCES; tufted hairgrass)

Environment- This common type occurs on moist stream terraces, extensive subirrigated benchlands, small valley seeps and just above the drawdown zone of lakes and ponds. Small stands occur throughout the study area at 5,000-8,000 ft. Adjacent sites are dominated by *Juncus balticus, Potentilla fruticosa, Carex utriculata, C. simulata* or *Salix* spp. Adjacent upland vegetation is dominated by *Artemisia tridentata, A. tripartita*, and/or *Festuca idahoensis.*

Vegetation- The dominant aspect of these sites is a continuous dense canopy of grass, the dominants of which *Deschampsia cespitosa* and *Juncus balticus*, usually abundantly represented, but the mere presence of *D. cespitosa* under intense grazing is enough to indicate these moist to wet sites. *Muhlenbergia richardsonis* and *Carex praegracilis* are other common graminoids. The cover and diversity of forbs is low to moderate. *Aster occidentalis,*

Potentilla anserina, P. gracilis and *Crepis runcinata* are common species. Mosses are common; occasionally they will form a nearly continuous layer.

Soils- Soils are silty to silty clays in texture. There is little bare ground and no surface gravel.

Other Studies- Hansen et al. (1991) describe *Deschampsia cespitosa* habitat type as a major landscape component for Montana. Similar types have been described for the Blackfoot River Valley (Lesica 1994) and the Blackfeet Indian Reservation (Lesica 1989). Wet meadows dominated by *D. cespitosa* have also been described for the alpine zone of southwestern Montana mountains (Cooper and Lesica 1992). Youngblood et al. (1985) described this vegetation type for Wyoming and Idaho; in fact this is one on the most widespread wetland types of the Intermountain West (Padgett et al. (1989) and also extends to near-coastal environments (Bourgeron and Engelking 1994).

Comments- (see comments under JUNBAL/CARPRA). This vegetation is productive and often remains green throughout the growing season, making it attractive to livestock, especially late in the year. The moist to wet soils and generally small size of stands make this type very prone to degradation.

Natural Heritage Program Rank- G4/S4

Juncus balticus-Carex praegracilis community type
(JUNBAL-CARPRA; baltic rush-field sedge)

Environment- JUNBAL-CARPRA is a wetland association common in subirrigated sites on stream terraces, pond and lake margins, and in swales of alluvial fans. It occurs at 6,500-7,200 ft in the major valleys of the Tendoy Mountains and in the Centennial Valley. Most examples of this type have developed hummock-hollow microtopography. Adjacent moister sites are often dominated by *Potentilla fruticosa* and *Deschampsia cespitosa* or *Salix* spp. and *Carex* spp. Occasionally, JUNBAL/CARPRA will adjoin *Carex simulata-* and *Carex nebrascensis-*dominated fens and wet meadows. Adjacent drier wetland types are dominated by *Poa juncifolia* and *Elymus cinereus*. *Festuca idahoensis* and *Artemisia tridentata, A. tripartita* or *A. longiloba* dominate adjacent uplands. This type appears to be most common in areas of predominantly calcareous parent material.

Vegetation- Graminoid cover is over 80% in most stands. Dominant species include *Juncus balticus, Carex praegracilis* and *Muhlenbergia richardsonis*. Other common graminoids are *Deschampsia cespitosa* and *Poa juncifolia*. Cover of forbs is variable, probably depending on grazing history and moisture regime. Forb diversity is low to moderate. Common species include *Antennaria microphylla, Aster occidentalis, Crepis runcinata, Haplopappus uniflorus* and *Potentilla gracilis*. Bryophyte coverage is highly variable, trace amounts to a nearly continuous blanket.

Soils- Soils have a silty to clayey texture and are moist throughout most of the growing season. They have a near-neutral or slightly alkaline reaction and may also be mildly saline in some cases. Bare soil is generally uncommon except for areas that are heavily trampled.

Other Studies- Hansen et al. (1991) describe the *Juncus balticus* community type for Montana and state that it is a grazing-induced disclimax of vegetation previously dominated by *Deschampsia cespitosa* or *Calamagrostis canadensis*. They report that *Juncus balticus* and *Hordeum jubatum* are the only common species, suggesting that their type is significantly different than JUNBAL/CARPRA of southwest Montana. Lesica (1989) described a *Deschampsia cespitosa/Juncus balticus* association with similar composition for the Blackfeet Reservation of northwest Montana. Similar vegetation has also been described for the Blackfoot River Valley of Montana (Lesica 1994) southward into Idaho and Wyoming (Youngblood et al. 1985) to as far south as southern Utah (Padgett et al. 1989).

Comments- If *Juncus balticus* plant associations are a grazing-induced disclimax of *Deschampsia cespitosa* associations (Hansen et al. 1991), *D. cespitosa* should be negatively correlated with abundance of *J. balticus*, forbs and exotics, and abundance of *J. balticus* should be positively correlated with abundance of forbs and exotics. This does not appear to be the case in our study area. A Pearson's correlation coefficient (r) matrix is given below:

	Junbal	Desces	Forbs	Exotics
Junbal	1.000			
Desces	0.019	1.000		
Forbs	-0.297	-0.272	1.000	
Exotics	-0.122	-0.020	0.110	1.000

There was almost no correlation between the cover of *D. cespitosa* and *J. balticus*. Both species decrease as the abundance of forbs and exotics increase, although the correlation is not strong. These results suggest that both species decrease with grazing disturbance and that the abundance of forbs is a better indicator of disclimax than the abundance of *J. balticus*, at least in our study area. Results of our ordination suggest that Juncus balticus is dominant in slightly drier sites that *D. cespitosa*.

Variety *montanus* is the common form of *Juncus balticus* in Montana. However one of our stands was a nearly complete monoculture of *J. balticus* var. *vallicola*, a more robust form of the species. This stand on a pond drawdown zone had the appearance of a bulrush monoculture. This vegetation may warrant recognition as a separate type if it occurs in other locations.

Trampling by livestock, especially during the spring and early summer results in the formation or enhancement of hummocks. The presence of substantial hummocking may allow the invasion of the shrub, *Potentilla fruticosa*, into habitats that are otherwise too wet.

Natural Heritage Program Rank- G5/S5 (this ranking is just for the JUNBAL c.t., not the community type newly described herein, which appears distinct in several respects)

Elymus cinereus-Puccinellia distans community type
(ELYCIN-PUCDIS; basin wildrye-weepingalkaligrass;
WHTF designation *Leymus cinereus-Puccinellia distans*)

Environment- Stream terraces and lower portions of alluvial valley floors at 6,500-7,000 ft may support narrow corridors or extensive stands of ELYCIN-PUCDIS. This type is usually associated with areas dominated by limestone parent material. Adjacent moister vegetation may be dominated by *Juncus balticus, Potentilla fruticosa, Deschampsia cespitosa* or *Salix* spp. and *Carex* spp. Adjacent upland vegetation supports stands dominated by *Artemisia longiloba, A. tripartita*, or *A. tridentata wyomingensis* and *Festuca idahoensis*.

Vegetation- These species-poor associations are dominated by *Poa juncifolia, Puccinellia distans* and *Carex praegracilis*. *Elymus cinereus* may be dominant, sometimes forming near monocultures, in stands that have not suffered grazing pressure. The abundance of and species composition of the forbs is variable and depends upon the moisture regime, soil texture, salinity, and degree of disturbance. *Haplopappus uniflorus* and *Antennaria microphylla* are common forb species. The shrub *Chrysothamnus nauseosus* is usually present and may be common. Mosses and lichens are absent.

Soils- Soils are usually saline with a silty or clayey texture. Reaction is neutral to alkaline. The surface is 60-90% bare with little or no gravel. Soils may be affected by natural or man-caused subirrigation.

Other studies- Similar vegetation dominated by *Elymus cinereus, Agropyron smithii* and *Puccinellia distans* in northwest Montana was briefly discussed by Mueggler and Stewart (1980, p. 75) and Lesica (1988); a general

ELYCIN c.t. is found from Washington, Oregon, through Idaho to Colorado but has curious gaps (not cited for Wyoming or Utah) that may reflect a lack of inventory rather than an intrinsic absence (Bourgeron and Engelking 1994).

Comments- Although *Elymus cinereus* is highly palatable to livestock only early in the growing season, its tall stature makes it very sensitive to heavy grazing. We believe that broad alluvial valleys of southwest Montana may have been dominated by *E. cinereus* before the advent of the livestock industry over 100 years ago. With the decline of this robust grass, smaller species adapted to saline soils, such as *Poa juncifolia, Puccinellia distans* and *Carex praegracilis* assumed dominance.

Natural Heritage Program Rank- G3/S2 (This rating is just for the *Elymus cinereus* c.t., the c.t. recognized here is probably a distinct syntaxon.)

Eleocharis palustris-Hordeum jubatum community type
(ELEPAL-HORJUB; common or pale spikerush-foxtail barley)

Environment- This vegetation is restricted to saline soils associated with ponds and shallow lakes. Sites are flooded in the spring to early summer but dry later in the growing season. These habitats occur at ca. 6,600 ft on the floor of the Centennial Valley. Immediately adjacent vegetation may be dominated by *Poa juncifolia, Carex praegracilis* or *Elymus cinereus.* Upland vegetation in the area is dominated by *Artemisia tripartita* and *Festuca idahoensis.*

Vegetation- This species-poor vegetation is dominated by *Hordeum jubatum, Eleocharis palustris* and/or *Chenopodium glaucum. Hordeum jubatum* is most common in the drier portions, while *C. glaucum* may dominate the wetter portions. *Poa juncifolia* and *Carex praegracilis* may also be common in the higher portions.

Soils- Soils have a silty to clayey texture and are undoubtedly saline as a result of the repeated drawdown cycles. Almost the entire soil surface is bare.

Other Studies- Similar vegetation has been described as the *Eleocharis palustris* c. t. by Hansen et al. (1991). Lesica (1994) described a similar type for glacial wetlands in the Blackfoot River Valley of Montana. This vegetation was described as two different types for glacial wetlands on the Blackfeet Indian Reservation in northwest Montana: the *Eleocharis palustris/Hordeum jubatum* association and the *Eleocharis palustris/Chenopodium glaucum* association (Lesica 1989).

Comments- Hansen et al. (1991) believe that this plant association is seral and will be replaced by climax species such as *Distichlis stricta.* Although *H. jubatum* does tend to colonize disturbed sites, we saw no evidence that these communities were the result of man-caused disturbance. Vegetation dominated by *Hordeum jubatum* and *Chenopodium glaucum* may warrant recognition as two separate associations.

Natural Heritage Program Rank- G4/S4

Agropyron smithii/Alluvial flat community type
(AGRSMI/ALL; western wheatgrass/alluvial flat;
WHTF designation *Pascopyrum smithii*/Alluvial flat c.t.)

Environment- This is an uncommon type in southwestern MT, occrring on alluvial floodplains that experience regular overland flow flooding or heavy-textured soils. It is found on islands of the Big Hole River at ca. 5,000-5,200 ft. Slightly higher areas are dominated by *Artemisia tridentata tridentata* and *Agropyron spictum.* Adjacent

sites can support *Populus trichocarpa* forests. Hansen et al. (1991) consider at least a portion of this type to be wetland sites (jurisdictional wetlands).

Vegetation- Graminoid cover is high, but *Agropyron smithii* is the only dominant grass. *Koeleria cristata, Poa pratensis* and *Carex stenophylla* are other common species. *Equisetum hyemale* is the only common forb. A number of weedy forbs, such as *Grindellia squarrosa, Cirsium arvense, Tragopogon* spp. and *Melilotus officinalis*, may be present. Mosses and lichens are absent.

Soils- Soils are silt loams. There is no gravel on the surface.

Other Studies- Coupland (1950) reports a similar type from alluvial floodplains in Alberta. Hansen et al. (1991) cite this as an important type in central and eastern Montana and in varying degrees of importance it extends to Colorado and Utah (Bourgeron and Engelking 1994).

Comments- This vegetation is clearly seral to *Populus trichocarpa* forest or *Artemisia tridentata tridentata/Agropyron smithii.* Flooding or ice scour apparently retards colonization by woody species. These sites are likely areas to be invaded by *Euphorbia esula* (leafy spurge).

Natural Heritage Program Rank- G3G5/S4

Festuca idahoensis-Agropyron caninum community type
(FESIDA-AGRCAN; Idaho fescue-bearded wheatgrass;
WHTF designation *Festuca idahoensis-Elymus trachycaulus*)

Environment- This type is common on upper slopes, rolling uplands and gentle ridgetops at 7,400-9,200 ft in the Tendoy and Centennial Mountains. These mesic, productive grasslands often occur in snow catchment areas such as lee slopes just below ridge lines. Vegetation dominated by *Artemisia tridentata vaseyana* often occurs below in slightly drier sites. Steep slopes on cool slopes support *Pseudotsuga menziesii, Pinus flexilis*, or *P. albicaulis* forests. Adjacent exposed ridge tops often support the cushion plant communities, AGRSPI-CUSH or CARRUP-POTOVI.

Vegetation- FESIDA-AGRCAN is dominated by *Festuca idahoensis* and the robust grasses, *Agropyron caninum* and *Bromus carinatus*. *Carex petasata* and *Koeleria cristata* are other common species. The introduced *Poa pratensis* may be common in sites that have experienced heavy grazing pressure. This association has high cover of tall and low forbs and high species diversity. Common forbs include *Geum triflorum, Geranium viscosissimum, Arenaria congesta, Erigeron compositus, Achillea millefolium, Artemisia ludoviciana, Galium boreale*, and *Lupinus* spp. *Taraxacum officinale* may be common in some lower stands with a history of grazing pressure. Moss and lichens are rare.

Soils- Soils are deep, often with a surface horizon of loess. Parent materials are limestone, mixed sedimentary or volcanic. Bare ground usually has less than 20% cover, and rock and gravel are minimal.

Other studies- Mueggler and Stewart (1980) describe this type for western Montana. They state that high abundances of forbs such as *Geum triflorum* and *Achillea millefolium* are the result of grazing pressure.

Comments- The mesic *Geranium viscosissimum* phase of this type described by Mueggler and Stewart (1980) occurs on loessalsoils. This type is frequently used by deer, elk and antelope. Disturbance due to pocket gophers (*Thomomys talpoides*) is abundant.

One very mesic stand at 8,500 ft in a forest opening lacked *Festuca idahoensis* and was dominated by *Stipa occidentalis, Danthonia intermedia, Agropyron caninum* and *Carex* spp. Pocket gopher digging and evidence of

elk and sheep grazing was apparent. Similar tall grass meadows have also been observed at the same elevation at the south end of the Snowcrest Range. These associations may constitute a distinct community type.

Natural Heritage Program Rank- G4/S4

Festuca idahoensis-Agropyron spicatum community type
(FESIDA-AGRSPI; Idaho fescue-bluebunch wheatgrass;
WHTF designation *Festuca idahoensis-Pseudoroegneria spicata*)

Environment- Moderate to steep slopes in the Tendoy Mountains at 6,000-7,500 ft may support stands of FESIDA/AGRSPI. Adjacent sites with deeper soils are dominated by *Artemisia tridentata vaseyana*. Rockier sites on warm slopes are often dominated by *Cercocarpus ledifolius*, while *Pseudotsuga menziesii* and *Pinus flexilis* forests occur on cooler slopes.

Vegetation- Stands are dominated by the diagnostic grasses *Festuca idahoensis* and *Agropyron spicatum*; on lightly grazed sites their combined cover can exceed 70%. *Koeleria cristata* is also common. The shrubs, *Chrysothamnus nauseosus* and *Artemisia tridentata tridentata*, may be present but are not common. Forbs are diverse and abundant. Common species include *Phlox hoodii, P. muscoides, Achillea millefolium, Antennaria microphylla* and *Draba oligosperma*. Mosses and especially lichens may be common.

Soils- Soils are well-drained and silty in texture. Little of the surface is bare, but gravel is common.

Other Studies- This vegetation has been described for western Montana by Mueggler and Stewart (1980). The type has also been documented to extend from the Kamloops area of British Columbia southward through Washington, Idaho and Wyoming, (Bougeron and Engelking 1994).

Natural Heritage Program Rank- G4/S4

Agropyron dasystachyum/Phacelia hastata CommunityType
(AGRDAS/PHAHAS; thickspike wheatgrass/silverleaf phacelia;
WHTF designation *Elymus lanceolatus* ssp. *lanceolatus/Phacelia hastata*)

Physical Setting- This type has only been observed in the Centennial Valley. It occurs on sand dunes and blow outs at elevations around 6700 feet. Bare soil (sand) cover ranges from 60 to 90% and coarse fragments are absent. The soil surface is usually unstable because of a lack of adequate vegetation cover. Parent materials are eolian sand deposits. Soils are very deep Ustic Torripsamments and lack coarse fragments and are not calcareous. Textures are sands and available water holding capacity is low due to the coarse texture.

Vegetation- *Agropyron dasystachyum* is well represented to abundant within this community type. Other species that are generally present with cover ranging from 1 to 20% include *Chrysothamnus nauseosus, Tetradymia canescens, Eriogonum ovalifolium* v. *celsum, Linum perenne, Phacelia hastata, Psoralea tenuifolia, Oryzopsis hymenoides*, and *Stipa comata.*

Adjacent Communities- The *Artemisia tripartita/Festuca idahoensis* and *A. tridentata/Festuca idahoensis* types are usually found on adjacent more stable soils and sites.

Other Studies- This type has not been previously described.

Natural Heritage Program Rank- G2?/S2?

Agropyron spicatum-Agropyron smithii community type
(AGRSPI-AGRSMI; bluebunch wheatgrass-western wheatgrass;
WHTF designation *Pseudoroegneria spicata-Pascopyrum smithii*)

Environment- This uncommon type occurs on gently sloping alluvial fans at ca. 6,000-7,000 ft. as well as moderate to steep eroding slopes at 6,600-7,500 ft in the Centennial Mountains. Vegetation dominated by *Artemisia tridentata* ssp. *vasayana* and either *Agropyron spicatum* or *Festuca idahoensis* occurs on adjacent deeper or less erodible soils.

Vegetation- *Agropyron spicatum* and *A. smithii/dasystachyum* are common. Examples lower down on alluvial fans have abundant *Calamagrostis montanensis* and *Stipa comata*; both of these species probably increase with grazing at the expense of the wheatgrasses and are also associated with coarser-textured soils. *Gutierrezia sarothrae* and *Artemisia frigida* are common subshrubs that also increase with grazing. Forbs are uncommon. *Hesperocloa kingii* is common and occasionally well represented in examples of this type occurring on steep slopes of the Centennial Mountains. Subshrubs and other grasses are uncommon, but forbs are abundant and diverse. Common species include *Ipomopsis congesta* and *Aster occidentalis*. Mosses and lichens are rare.

Soils- This type appears to be most common on soils derived from calcareous parent materials, limestone or calcareous sandstone. Bare soil is abundant and surface gravel is common. Soils of slopes in the Centennial Mountains in the Peet Creek area are unstable and prone to slumping.

Other Studies- Mueggler and Stewart (1980) and Jorgensen (1979) describes this type for east and occasionally west of the Continental Divide in Montana. Their type is very similar to stands from southwest Montana that occur on alluvial fans. AGRSPI-AGRSMI is also reported from Wyoming (Bougeron and Engelking 1992).

Comments- Extensive areas of the Centennial Mountains between Sand Creek and Peet Creek are dominated by highly erodible soils derived from calcareous sandstone. The grasslands occurring on these soils have been included here, but they may constitute a distinct phase of the AGRSPI/AGRSMI c.t. or perhaps a distinct community type.

Heavy livestock grazing or motorized vehicle use of these sites is not desirable due to the erodible nature of the soil.

Natural Heritage Program Rank- G4/S4

Agropyron spicatum/Oryzopsis hymenoides Community Type
(AGRSPI/ORYHYM; bluebunch wheatgrass/Indian ricegrass;
WHTF designation *Pseudoroegneria spicata-Oryzopsis hymenoides*)

Environment- The type occurs on steep badland sites at elevations around 5500 feet. Bare soil cover totals 20 to 70% and most of the remaining ground cover is comprised of coarse fragments. The soil surface is unstable because of a lack of adequate vegetation cover and rill and sheet erosion is common.

Parent materials are sedimentary rocks and soils are shallow and poorly developed. Soils range from not gravelly to very gravelly and are strongly to violently effervescent. Textures are sands to loams and available water holding capa-city is low.

Vegetation- Total vegetation cover in this badlands type seldom exceeds 15%. Characteristic species include *Gutierrezia sarothrae*, *Agropyron spicatum*, *Aristida longiseta*, and *Oryzopsis hymenoides*.

Adjacent Communities- Vegetation on adjacent more stable soils include the *Artemisia tridentata/Agropyron spicatum* and *Agropyron spicatum/Bouteloua gracilis* types.

Other Studies- This type has not previously been reported in Montana but has been reported in Wyoming (Bourgeron and Engelking 1991).

Natural Heritage Program Rank- G3?/S2?

Agropyron spicatum/Cushion plant community type
(AGRSPI/CUSH; bluebunch wheatgrass/cushion plant;
WHTF designaton *Pseudoroenegria spicata*/cushion plant)

Environment- This uncommon type occurs on windswept, limestone ridge crests and upper slopes in the Tendoy and perhaps Centennial Mountains at 8,000-9,000 ft. Adjacent sites with deeper soils are often dominated by *Artemisia tridentata vaseyana* and *Festuca idahoensis*. Cool slopes below these ridges may support *Pseudotsuga menziesii* or *Pinus flexilis* forests.

Vegetation- The dominant graminoids are *Agropyron spicatum, Hesperocloa kingii* and *Carex filifolia*. Shrubs are completely absent. There is a rich assemblage of low forbs, including many cushion-forming species such as *Cymopterus bipinnatus, Lesquerella alpina, Phlox hoodii, Eritrichium nanum, Oxytropis campestris* and *Townsendia* spp. Forbs have significantly more basal cover than graminoids, especially in the most exposed sites. Mosses and especially lichens are common.

Soils- Soils are calcareous and shallow. Most of the surface is covered with gravel or the plant cushions.

Other Studies- DeVelice and Lesica (1993) described an extensive AGRSPI/CUSH type from windswept calcareous ridges at low to mid-elevations on the south side of the Pryor Mountains in south-central Montana. Although the forbs in these two types have the same low, cushion-like physiognomy, there is little overlap in species composition. Lesica (1988) described a sparsely vegetated grassland dominated by *Agropyron spicatum* and *Eriogonum ovalifolium* in northwest Montana; however, this type is developed on excessively drained gravels and exhibits a different suite of forbs, without the high diversity of AGRSPI/CUSH. Alpine cushion plant communities described by Cooper and Lesica (1992) also have a similar physiognomy and many forb species in common, but the common graminoids are *Carex rupestris, C. elynoides* and *Festuca ovina*.

Comments- This type may occur lower but only on the most extremely exposed and edaphically harsh sites. Extensive areas will occur only at higher elevations.

These sites may provide important winter range for bighorn sheep. Vegetation of these dry, exposed sites is easily damaged by motorized vehicles and recovers slowly.

Natural Heritage Program Rank- This type is currently unranked and has insufficient number of elements to justify a call at this time.

Agropyron spicatum-Poa sandbergii community type
(AGRSPI/POASEC; bluebunch wheatgrass-Sandberg bluegrass;
WHTF designation *Pseudoroegneria spicata-Poa secunda*)

Environment- AGRSPI-POASAN is common on moderate to steep slopes and alluvial fans, usually with a warm aspect. Elevations range from 5,800-7,500 ft. Adjacent deeper soils often support vegetation dominated by *Artemisia tridentata* and *Festuca idahoensis*. Cooler aspects or higher elevations support woodlands dominated by *Pinus flexilis* or *Pseudotsuga menziesii*. Very rocky outcrops are dominated by *Cercocarpus ledifolius*. Most stands occur south of Dillon. Along the east front of the northern Tendoy Mountains, this vegetation often forms mosaics that include shallow drainages and bald limestone outcrops.

Vegetation- Dominance is shared by *Agropyron spicatum*, *Stipa comata* and *Oryzopsis hymenoides*. *Poa secunda* and *Koeleria cristata* are present in small amounts in most stands. The subshrubs *Artemisia frigida* and *Gutierrezia sarothrae* are usually present. Forbs cover is low but diverse. Common species include *Phlox hoodii, Haplopappus acaulis, Arenaria kingii, Penstemon aridus* and *Lesquerella alpina*. Mosses are rare, but lichens may be common in some stands.

Soils- Parent materials are limestone or mixed sedimentary. 20-50% of the soils is exposed and gravel is abundant on the surface. Soils are generally well drained and often sandy in texture.

Other Studies- AGRSPI-POASAN (=AGRSP-POASEC) is described for western Montana by Mueggler and Stewart (1980). Daubenmire (1970) describes a similar type with lower forb diversity and without *Stipa comata* that was once extensive in eastern Washington. AGRSPI-POASAN apparently extends as far south as northern Colorado and Utah but is only a significant landscape component in Wyoming (Bourgeron and Engelking 1994).

Comments- All of our stands fit the description of the *Stipa comata* phase of the *Agropyron spicatum/Poa secunda* c.t. (Mueggler and Stewart 1980). *Stipa comata, Poa sandbergii* and the subshrubs *Gutierrezia sarothrae* and *Artemisia frigida* increase with increasing grazing pressure, but at higher intensities *S. comata* decreases.

Natural Heritage Program Rank- G4/S4

Stipa comata/Psoralea tenuiflora community type
(STICOM/PSOTEN; needle-and-thread/scurf pea)

Environment- This seral type characterizes recently stabilized blowouts of sandhills at 6,600-6,900 ft on the northeast side of the Centennial Valley. Adjacent vegetation is dominated by various combinations of *Artemisia tripartita* or *A. tridentata tridentata* with *Festuca idahoensis* or *Stipa comata* or yet earlier, forb-dominated seral vegetation.

Vegetation- Grass canopy cover is generally less than 30%. Dominant species are *Stipa comata, Agropyron dasystachyum* and *Oryzopsis hymenoides*. Scattered *Chrysothamnus nauseosus* shrubs may be present. Forb cover is 10-30% with moderate diversity. *Psoralea tenuiflora, Opuntia fragilis*, and *Phacelia hastata* may be abundant. Other common forbs include *Machaeranthera canescens, Allium textile* and *Comandra umbellata*. Mosses and lichens are not present.

Soils- Soils are very sandy with little horizon development. They were probably stabilized relatively recently. 60-95% of the surface is bare.

Other Studies- Lesica (1987) described a similar association from the sandhills near Medicine Lake in Sheridan County, Montana. The *Stipa comata/Bouteloua gracilis* habitat type of Mueggler and Stewart (1980) is found at lower elevations and has *Bouteloua gracilis* and many different forbs than STICOM/PSETEN.

Comments- This vegetation is endemic to sandhills and other areas of very sandy soils. It is clearly a seral community associated with undeveloped soils and periodic disturbance from grazing, fire and/or wind.

Natural Heritage Program Rank- (Ranking has not been assigned, but expected to be high as the Centennial Sandhills site is the only location known at this time)

Stipa comata-Bouteloua gracilis plant association
(STICOM-BOUGRA; needle-and-thread ♦ blue grama)

Environment- STICOM-BOUGRA occurs from the floors and gently sloping coalesced alluvial fans of intermountain valleys upslope to where it intergrades with *Festuca idahoensis*- and *Artemisia tridentata* ssp. *vaseyana*-dominated rangelands. Lowest elevation occurrences are represented by valley bottoms (non-saline or alkaline sites) around 4,500 ft. and the type extends as high as 6,300 ft as small patches with coarse-textured soils within a mosaic of more mesic vegetation. It is apparently not aspect or slope restricted within this elevation range but habitats within this landscape are generally low gradient (<25% slope). Mueggler and Stewart (1980) term STICOM-BOUGRA the driest of western Montana grassland habitat types; it is certainly the most extensive dry grassland type but is no drier than the more areally restricted AGRSPI-ORYHYM, STICOM/PSOTEN or ARSPI/Cushion Plant community types.

Vegetation- All sites sampled and noted in reconnaissance supported abundant *Stipa comata*, the diagnostic species, but cover was highly variable (20-80%) depending on grazing history and intrinsic severity of site, ostensibly controlled by the amount of gravel and stone in substrate. Cover of *Bouteloua gracilis*, the other diagnostic species, is also highly variable but shows a clinal response of increasing cover west to east. It was only sporadically encountered in the westernmost valley between Tendoy and Beaverhead Ranges. Other graminoids frequently occurring, usually poorly represented, include *Koeleria cristata*, *Carex stenophylla* and *Poa sandbergii*. Though ubiquitous on these sites it is here that the increase in cover of *Artemisia frigida* and *Gutierrhizia sarothrae* with the increasing intensity of grazing is so apparent. Ceratoides lanata is also consistently present, in scare amounts. Forb cover and diversity is usually low, those species with the highest cover are often exotic weeds or escaped agricultural introductions (e.g. *Melilotus officinalis*, *Salsola kali*, *Medicago sativa*, *Taraxacum officinale*). *Sphaeralcea coccinea*, a increaser with grazing, is highly constant but scarece; no other forbs had even 50% constancy.

Soils- Given the position of these sites within the landscape and composition (dominance of *Stipa comata*) it follows that the soils are medium-textured to sandy, usually loamy Mollisols or Aridisols with free calcium carbonate at and near the surface. The amount of bare substrate (soil, gravel, rock) ranged from 20 to 50%; most of the surface is covered with litter and cryptogamic crust (dominated by lichens), the relative proportions of which are highly variable.

Other Studies- Coupland (1961) in southern Saskatchewan described a STICOM-BOUGRA faciation on sandy sites within the mixed-grass prairie. This major plant association extends southward along the western fringe of the Great Plains in eastern Montana, Wyoming and Colorado (Bourgeron and Engelking 1994). The study area constitutes the western extreme of its distribution. Daubenmire described a STICOM-*Poa sandbergii* habitat type in eastern Washington that is similar to STICOM-BOUGRA in landscape position, community type matrix and dominants (with the exception of *Bouteloua gracilis* absence in WA). He showed with detailed soil analyses that *Stipa comata*-dominated sites differed at 95% confidence level from *Agropyron*- and *Festuca*-dominated sites in having both coarser (drier) and less fertile (lower exchange capacity and lower nutrient content) soils.

Natural Heritage Program Rank- G5/S5

Carex rupestris/Potentilla ovina community type
(CARRUP/POTOVI; curly sedge/sheep cinquefoil)

Environment- CARRUP/POTOVI occurs on exposed ridges at 9,000-9,500 ft on the highest portion of the Tendoy Mountains. This type may also occur in the Centennial Mountains but was not sampled there. More protected sites

that receive snow cover support vegetation dominated by *Festuca idahoensis*. Adjacent cool slopes support forests dominated by *Picea* , *Pseudotsuga menziesii* or *Pinus flexilis*.

Vegetation- The herbaceous vegetation is low, and shrubs are completely absent. Dominant graminoids include *Carex rupestris, Poa secunda, Festuca ovina* and *Calamagrostis purpurascens*. An unidentified,fine-leaved,sterile sedge was common to well represented in two stands. *Koeleria cristata* was frequent and well represented but not abundant. *Selaginella densa, Cymopterus bipinnatus, Arenaria obtusiloba, Erigeron compositus, Oxytropis campestris, Senecio canus* and *Potentilla ovina* are common forbs. Lichens and mosses are common.

Soils- This type is confined to shallow, limestone-derived soils. Bare soil and gravel are common.

Other Studies- CARRUP/POTOVI has been described for alpine areas of calcareous ranges of southwest Montana by Cooper and Lesica (1992). Similar communities have been described for alpine areas of Idaho (Moseley 1985), Utah (Lewis 1970) and Colorado (Komarkova and Webber 1978, Willard 1979).

Comments- Some stands at lower elevations are dominated by *Calamagrostis purpurascens*. *Agropyron spicatum* is also present in these stands that may represent transitions to the AGRSPI/CUSH type. Some stands may be impacted by sheep grazing or pocket gophers. These sites may provide important winter range for bighorn sheep. Vegetation of these dry, exposed sites is easily damaged by motorized vehicles and recovers slowly.

Natural Heritage Program Rank- G3/S3

Carex rostrata Plant Association
CARROS; beaked sedge

Environment- This is perhaps the most common of mid to high elevation wetland types in Montana, but within the Dillon R.A., particularly the Centennial Valley, it is rather uncommon. It was found only as a narrow, linear feature, bordering steams or pond margins with continuously saturated soils. It can be found from valley bottoms to the upper subalpine elevations (9,000 ft plus). Even in midsummer soils of these sites are saturated to the surface and often have standing water as well.

Vegetation- *Carex rostrata* and *Carex aquatilis* share dominance, their relative coverage proportions often showing a many-fold difference within one occurrence and often total cover approaches 100%. The fact these are agressively rhizomatous graminoids may explain site preemption (local dominance of one of the two speices) and the low species diversity exhibited by this type, though the environment itself is considerably restrictive. Other graminoids consistently present, often well represented include *Calamagrostis stricta* and *Juncus balticus*. Shurbs, *Salix* spp. and *Potentilla fruticosa*, and forbs, principally *Epilobium* spp., are present in trace amounts.

Soils- Substrates are continuously saturated and have a high organic content, though of the sites investigated, none had histic epipedons. Soils were formed from alluvium of various sources and generally moderately coarse-textured, though lenses of silty-clays were also encountered. The energy environment at the time of deposition determines the texture of alluvium; hydrologic regime, rather than soil (as water supplying medium) is the main determinant of this habitat.

Other studies- This is an extremely common and broadly distributed wetland type, ranging as far south as New Mexico and Arizona (Bourgeron and Engelking 1994). In Montana probably more sampling has been done to document the regional permutations of this type than has been conducted for any other wetland type. Thus three phases are recocognized of which *Carex aquatilis* is the one sampled and commonly represented in the Dillon R.A.; the *Deschampsia cespitosa* phase may have been extirpated by heavy grazing of these riparian/wetland habitats, most especially those of the Centennial Valley.

Natural Heritage Program Rank- G5/S5

Carex simulata plant association
(CARSIM; short-beaked sedge)

Environment- This minor, but distinctive, fen community type was found confined to saturated organic soils developed in association with springs/subirrigation on stream terraces at 6,600-7,000 ft. in the vicinity of the Tendoy and Centennial Ranges; the actual elevation range is probably considerably greater This vegetation type occurs on some of the wettest sites sampled in southwestern Montana. Plants generally occur on hummocks or mats between areas of standing water. Slightly drier adjacent communities are dominated by *Potentilla fruticosa* and *Juncus balticus* or *Poa juncifolia, Puccinellia distans*, and *Carex praegracilis*, or *Salix* spp. and *Carex utriculata.* Upland vegetation is dominated by *Artemisia tridentata, A. cana* or *A. longiloba* and *Festuca idahoensis* or *Elymus cinereus*.

Vegetation- Stands usually have fewer than ten species. *Carex simulata* is dominant and abundant. *Carex nebrascensis, Eleocharis pauciflora*, and *Deschampsia cespitosa* may be well represented in some stands. Forbs are generally not abundant. *Triglochin palustre* and *Epilobium palustre*, and *Ranunculus cymbalaria* are the most common forb species. Mosses are common, usually with 20-30% cover, though they can form a nearly continuous sward, occurring even where standing water existed at the time of sampling.

Soils- Soils are histisols. Reducing conditions, as evidenced by gleying, are 1 cm to greater than 20 cm below the surface. Water covers 30-80% of the surface.

Other Studies- Hansen et al. (1991) describe a *Carex simulata* habitat type from western Montana. Lesica (1990) described similar communities from higher elevations in southwest Montana, but *Carex aquatilis* and *Salix brachycarpa* were present in some stands. More species rich vegetation dominated by *Betula glandulosa, Potentilla fruticosa* and *Carex simulata* was described for north-central Montana (Lesica 1986). Fen vegetation dominated by *C. simulata* has also been described for Idaho, Wyoming and Utah (Padgett et al. 1989, Youngblood et al. 1985).

Comments- Light to moderate livestock grazing does occur in the CARSIM c. t. Although the effects of the associated herbivory are probably minimal, trampling may alter the habitat by creating hummocks that permit the invasion of shrubs and alien species.

Natural Heritage Program Rank- G3/S3

Phalaris arundinacea Community Type
(PHAARU; reed canarygrass)

Vegetation- *Phalaris arundinacea* dominates (often with a total canopy cover of 100%). The undergrowth is typically very depauperate due to the intense competition with *P. arundinacea. Poa palustris* may be well represented and *Cirsium arvense* and *Mentha arvensis* are often common. The total cover of the few additional species seldom exceeds 1%.

Environment- This type occurs on gravelly alluvial parent materials on flat flood plains in wide valley bottoms at elevations around 5000 feet. Litter and soil cover equals or exceeds 30% and 20% of the ground surface, respectively. The soil surface is generally stable with no evidence of accelerated erosion.

Soils- Soils are often Fluvaquents or Fluvents, are very deep with loamy sand to loam textures, medium available water holding capacity, and are non-calcareous. Coarse fragment contents vary from none to gravelly.

Adjacent Communities- Adjacent wetter sites often feature open water while adjacent drier riparian communities include the Populus trichocarpa/Cornus stolonifera type and a wide variety of other riparian types.

Other Studies- Within the western U. S. this type has been described only in Montana, where it is a common type from the western intermountain valleys to the eastern plains (Hansen et al. 1991). Some contend that Phalaris arundinacea is not a native species, hence this type should be recognized as a disturbance type.

Natural Heritage Program Rank- G4/S4

MANAGEMENT CONSIDERATIONS

One goal of federal land management agencies is to use ecological principles to manage land for both commodity production and the conservation of species diversity (Noss 1985, Probst and Crow 1991). In order to attain this goal it is necessary to have landcapes with all communities present in the conditions, quantities and spatial arrays similar to those to which resident organisms are adapted. In this section we discuss ways in which the vegetation has been changed since European settlement and ways in which it continues to be changed or may be changed in the future. No explicit recommendations are made. Rather, these observations point out particularly sensitive communities and community processes with the goal of helping to formulate future management options.

Livestock grazing

Cattle require water every day and are attracted to the relatively lush, green vegetation of wetland "islands" and riparian corridors, especially during the summer when the semi-arid steppe vegetation has already cured. The trampling compacts soils and breaks down stream banks, while the herbivory often results in a reduction of desirable species and an increase of exotics, native weedy species and less palatable species (increasers). Although wetlands and riparian areas occupy only a small proportion of most landscapes in the study area, they have an almost completely different species composition, regarding both plant and animal populations, than the forest or steppe matrix; thus they are thus very important for the maintenance of biological diversity.

Many plant communities associated with wetlands or streams in the study area have been degraded by livestock grazing. We believe that higher stream terraces have the potential to be dominated by *Artemisia tridentata* ssp. *tridentata*, *Artemisia cana*, *Sarcobatus vermiculatus* and *Elymus cinereus*. In most sites the sagebrush has been broken down or nearly eliminated, and *E. cinereus* generally now occurs only as scattered clumps. *Chrysothamnus nauseosus* and diminutive bluegrasses, such as *Poa juncifolia* and *P. cusickii*, have replaced these more productive species. We believe that much of this change occurred in the early part of the century when stocking rates were much higher.

Perhaps the most notable wetland feature of the Tendoy Mountains and Centennial Valley are the extensive alkaline meadow-fen mosaics found on lower stream terraces and around springs. As many as four wetland plant communities may occur in these areas: CARSIM, DESCES, JUNBAL/CARPRA and POTFRU/DESCES. These communities also harbor a number of rare plants (Vanderhorst and Lesica 1994). Most of this habitat is in private ownership, and much has been converted to hay production. The remainder is grazed by cattle and suffers significant impacts from trampling, especially early in the growing season when the ground is still wet. We have evidence that herbivory increases the abundance of forbs, while trampling can enhance hummock formation and may lead to an increase of shrubs.

Significant stands of these communities should be given special management that defers grazing until late summer or fall to protect their significant biological features. Exclosure studies may be

appropriate.

Livestock grazing may also have adverse effects on upland plant communities. Sites with highly erodible soils, such as those supporting AGRSPI/AGRSMI in the Price-Sand creeks area, are sensitive to trampling by livestock with the ultimate result being an increase in stream turbidity and siltation. In Montana, low sagebrush (*Artemisia longiloba*) communities are found only in southern Beaverhead County. This vegetation occurs only on heavy soils.

Significant stands of rare communities should be given special management that defers grazing unitl late summer or fall to protect their significant biological features. Exclosure studies may be appropriate.

Off-road vehicles

People drive four-wheel drive vehicles off of designated roads with increasing frequency. Areas dominated by low or sparse vegetation are most often chosen for ORV "recreation." Vegetation with very low productivity such as CARRUP/POTOVI and AGRSPI/CUSHION PLANT with take decades to recover from vehicle traffic (Billings 1973, Willard and Marr 1971). The highly erodible soils of the Sand Creek-Price Creek area of the Centennial Mountains should be protected from ORV use. The uncommon to rare ARTLON/AGRDAS, ARTLON/FESIDA and POTFRU/PTOVI communities occur on heavy soils that can suffer long-term damage from ORV use when wet in the spring.

Sand dunes are a favorite site for ORV "recreation." At this time the Centennial Valley is still remote, and the vegetation of the sandhills is dominated by shrubs. None-the-less, the Centennial Sandhills are a likely sit e to suffer degradation from future ORV use. ORV disturbances will retard succession and destroy colonies of the many rare plants occurring there.

Fire

Fire was a frequent disturbance in the presettlement landscape of southwest Montana, with probable return intervals of 20-40 years (Arno and Gruell 1983). Following settlement by Europeans, the fire frequency declined. *Artemisia tridentata* is killed by fire (Beetle 1982). As a result, we speculate a much smaller proportion of the steppe vegetation was dominated by *A. tridentata* before the turn of the century compared to the present. *Artemisia tripartita* sprouts readily following fire (Beetle 1982). In areas where both *A. tripartita* and *A. tridentata* are present (e.g. Centennial Valley), the latter may have increased at the expense of the former in recent times. Some pairs of plant communities here may occupy environmentally equivalent sites with different fire histories. For example, many stands of *Artemisia tridentata* ssp. *vaseyana/Festuca idahoensis* may become stands of *Festuca idahoensis/Agropyron caninum* given a natural fire frequency.

Many of the rare plants occurring in the Centennial Sandhills are associated with sparsely vegetated blowouts. Prior to advent of fire suppression, the sandhills were likely a shifting mosaic of vegetation in different stages of succession from the open sand of blowouts to dense stands of sagebrush and bunchgrass (*Stipa comata* and *Festuca idahoensis*). Maintaining the

early successional stages requires disturbance. Although livestock grazing may provide the necessary disturbance, fire is more likely the disturbance to which the system is evolutionarily adapted (see Schassberger 1988).

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APPENDIX A

COMPREHENSIVE LIST OF SOUTHWESTERN MONTANA PLANT COMMUNITIES

Community types uncommon (Rank ≤ 3) in Montana are highlighted and ones described in this document are in **bold**; the listing has been alphabetized by community type name without regard to lifeform. The G and S rankings given for each community type are estimates of the global and state rarity, respectively, for that type. These rankings have been determined by MTNHP staff in coordination with The Nature Conservancy and professional ecologists in Montana. The rankings are defined as follows:

G1 and S1 = 1 to 5 known occurrences
G2 and S2 = 6 to 20 known occurrences
G3 and S3 = 21 to 100 known occurrences
G4 and S4 = > 100 known occurrences
G5 and S5 = essentially ineradicable

TYPE NAME	RANK G	RANK S
ABIES LASIOCARPA/ALNUS SINUATA	G4	S4
ABIES LASIOCARPA/ARNICA CORDIFOLIA	**G5**	**S5**
ABIES LASIOCARPA/CALAMAGROSTIS CANADENSIS	G5	S5
ABIES LASIOCARPA/CALAMAGROSTIS RUBESCENS	**G5**	**S4**
ABIES LASIOCARPA/CAREX GEYERI	**G4**	**S4**
ABIES LASIOCARPA/CLEMATIS PSEUDOALPINA	G4	S3
ABIES LASIOCARPA/GALIUM TRIFLORUM	G4	S4
ABIES LASIOCARPA/LEDUM GLANDULOSUM	G4	S4
ABIES LASIOCARPA/LINNAEA BOREALIS	G5	S5
ABIES LASIOCARPA/LUZULA HITCHCOCKII	G5	S5
ABIES LASIOCARPA/MENZIESIA FERRUGINEA	G5	S5
ABIES LASIOCARPA-PINUS ALBICAULIS/VACCINIUM SCOPARIUM	G5	S5
ABIES LASIOCARPA/RIBES MONTIGENUM	**G5**	**S4**
ABIES LASIOCARPA/THALICTRUM OCCIDENTALE	**G4**	**S3**
ABIES LASIOCARPA/VACCINIUM CESPITOSUM	G5	S5
ABIES LASIOCARPA/VACCINIUM GLOBULARE	G5	S4
ABIES LASIOCARPA/VACCINIUM SCOPARIUM	G5	S5
ABIES LASIOCARPA/XEROPHYLLUM TENAX	G5	S5
AGROPYRON DASYSTACHYUM/PHACELIA HASTATA	**G2?**	**S2?**

TYPE NAME	RANK G	RANK S
AGROPYRON SMITHII/ALLUVIAL FLAT	G4	S3
AGROPYRON SPICATUM/AGROPYRON SMITHII	G5	S4
AGROPYRON SPICATUM/BOUTELOUA GRACILIS	G5	S4
AGROPYRON SPICATUM/CUSHION PLANT	G?	S?
AGROPYRON SPICATUM/ORYZOPSIS HYMENOIDES	G3?	S2?
AGROPYRON SPICATUM/POA SANDBERGII	G4	S4
ALNUS INCANA	G4	S3
ARTEMISIA ARBUSCULA/AGROPYRON SPICATUM	G4G5	S3S4
ARTEMISIA ARBUSCULA/FESTUCA IDAHOENSIS	G5	S3S4
ARTEMISIA CANA/FESTUCA IDAHOENSIS	G4	S4
ARTEMISIA LONGILOBA/AGROPYRON DASYSTACHYUM	GU	S?
ARTEMISIA LONGILOBA/FESTUCA IDAHOENSIS	G3	S2
ARTEMISIA PEDATIFIDA/FESTUCA IDAHOENSIS	G2	S2
ARTEMISIA TRIDENTATA V. TRIDENTATA/AGROPYRON SMITHII	G2G3	S?
ARTEMISIA TRIDENTATA V. TRIDENTATA/FESTUCA IDAHOENSIS	G3G4	SP
ARTEMISIA TRIDENTATA V. TRIDENTATA/STIPA COMATA	G?	S?
ARTEMISIA TRIDENTATA V. VASEYANA/AGROPYRON SPICATUM	G4	S?
ARTEMISIA TRIDENTATA V. VASEYANA/ELYMUS CINEREUS	G4	S?
ARTEMISIA TRIDENTATA V. VASEYANA/FESTUCA IDAHOENSIS	G4	S?
A. TRIDENTATA V. WYOMINGENSIS/AGROPYRON DASYSTACHYUM	G3	S3
A. TRIDENTATA V. WYOMINGENSIS/AGROPYRON SPICATUM	G5	S?
ARTEMISIA TRIDENTATA/AGROPYRON SPICATUM	G5	S5
ARTEMISIA TRIDENTATA/FESTUCA IDAHOENSIS	G5	S4
ARTEMISIA TRIDENTATA/FESTUCA SCABRELLA	G4	S4
ARTEMISIA TRIPARTITA/FESTUCA IDAHOENSIS	G3	S3
ARTEMISIA TRIPARTITA/AGROPYRON DASYSTACHYUM	G?	S?

TYPE NAME	RANK

	G	S
ATRIPLEX NUTTALLII/ORYZOPSIS HYMENOIDES	**G3G4**	**S2?**
BETULA GLANDULOSA/CAREX ROSTRATA	G3?	S3?
BETULA OCCIDENTALIS	G4	S3
CALAMAGROSTIS CANADENSIS	G4	S4
CAREX AQUATILIS	G5	S4
CAREX LASIOCARPA	G5	S4
CAREX LIMOSA	G3	S3
CAREX NEBRASKENSIS	G4	S3
CAREX ROSTRATA	**G5**	**S5**
CAREX RUPESTRIS/POTENTILLA OVINA	**G3**	**S3**
CAREX SCOPULORUM	G4	S4
CAREX SIMULATA	**G3**	**S3**
CERCOCARPUS LEDIFOLIUS/AGROPYRON SPICATUM	**G5**	**S4**
CERCOCARPUS LEDIFOLIUS/FESTUCA IDAHOENSIS	**G2?**	**S2?**
CHRYSOTHAMNUS VISCIDIFLORUS/STIPA COMATA	**G?**	**S?**
DESCHAMPSIA CESPITOSA	**G4**	**S4**
DESCHAMPSIA CESPITOSA/CAREX SPP	G4G5	S4
DISTICHLIS SPICATA	G4	S3
ELEOCHARIS PALUSTRIS	G4?	S4
ELEOCHARIS PALUSTRIS-HORDEUM JUBATUM	**G?**	**S?**
ELEOCHARIS PAUCIFLORA	G4	S4
ELYMUS CINEREUS	**G4**	**S2?**
ELYMUS CINEREUS-AGROPYRON SMITHII	G4	S3
ELYMUS CINEREUS-FESTUCA IDAHOENSIS	G4	S3
ELYMUS CINEREUS-PUCCINELLIA DISTANS	**G?**	**S?**
EQUISETUM FLUVIATILE	G4	S4
FESTUCA IDAHOENSIS/AGROPYRON CANINUM	**G4**	**S4**
FESTUCA IDAHOENSIS/AGROPYRON SMITHII	G4	S4
FESTUCA IDAHOENSIS/AGROPYRON SPICATUM	**G4**	**S4**

TYPE NAME	RANK G	RANK S
FESTUCA IDAHOENSIS/CAREX FILIFOLIA	G3?	S3
FESTUCA IDAHOENSIS/CAREX SCIRPOIDEA	G2	S2
FESTUCA IDAHOENSIS/DESCHAMPSIA CESPITOSA	G3G4	S3

FESTUCA IDAHOENSIS/LEUCOPOA KINGII	G2G3	S2
FESTUCA IDAHOENSIS/STIPA RICHARDSONII	G4	S3
FESTUCA SCABRELLA/AGROPYRON SPICATUM	G4	S4
FESTUCA SCABRELLA/FESTUCA IDAHOENSIS	G4G5	S4
GLYCERIA BOREALIS	G3	S3
JUNCUS BALTICUS	G5G4	S4
JUNCUS BALTICUS-CAREX PRAEGRACILIS	**G?**	**S?**
JUNIPERUS SCOPULORUM	G4	S3
JUNIPERUS SCOPULORUM/ARTEMISIA TRIDENTATA	**G2?**	**S2?**
JUNIPERUS SCOPULORUM/CERCOCARPUS LEDIFOLIUS	**G3**	**S3**
KALMIA MICROPHYLLA/CAREX SCOPULORUM	G3	S3
PHALARIS ARUNDINACEA	**G4**	**S4**
PICEA SP/CALAMAGROSTIS CANADENSIS	G3	S3
PICEA SP/EQUISETUM ARVENSE	**G4**	**S4**
PICEA SP/GALIUM TRIFLORUM	**G5**	**S4**
PICEA SP/LINNAEA BOREALIS	G4	S4
PICEA SP/PHYSOCARPUS MALVACEUS	G4	S3
PICEA SP/SENECIO STREPTANTHIFOLIUS	**G4**	**S4**
PICEA SP/SMILACINA STELLATA	G4	S4
PINUS ALBICAULIS	G4G5	S4S5
PINUS ALBICAULIS-ABIES LASIOCARPA	**G5**	**S5**
PINUS ALBICAULIS/CAREX GEYERI	G4	S4
PINUS ALBICAULIS/FESTUCA IDAHOENSIS	**G4**	**S4**
PINUS CONTORTA/CALAMAGROSTIS RUBESCENS	G5	S5
PINUS CONTORTA/LINNAEA BOREALIS	G5	S5
PINUS CONTORTA/PURSHIA TRIDENTATA	G3	S3
PINUS CONTORTA/VACCINIUM CESPITOSUM	G5	S5

TYPE NAME	**RANK**	
	G	**S**
PINUS CONTORTA/VACCINIUM SCOPARIUM	G5	S5
PINUS FLEXILIS/AGROPYRON SPICATUM	**G5**	**S4**
PINUS FLEXILIS/CERCOCARPUS LEDIFOLIUS	**G3G4**	**S3**
PINUS FLEXILIS/FESTUCA IDAHOENSIS	**G5**	**S4**
PINUS FLEXILIS/JUNIPERUS COMMUNIS	**G5**	**S4**
POA PALUSTRIS	G4	S4

POA PRATENSIS	G5	S5
POPULUS ANGUSTIFOLIA/CORNUS STOLONIFERA	G4	S3
POPULUS ANGUSTIFOLIA/POA PRATENSIS	G4G5	S4?
POPULUS TREMULOIDES/CALAMAGROSTIS RUBESCENS	G5	S4
POPULUS TREMULOIDES/CORNUS STOLONIFERA	G3	S3
POPULUS TREMULOIDES/POA PRATENSIS	**G4**	**S4**
POPULUS TREMULOIDES/THALICTRUM FENDLERI	**G5**	**S?**
POPULUS TRICHOCARPA/CORNUS STOLONIFERA	G4	S4
POPULUS TRICHOCARPA/POA PRATENSIS	**G4G5**	**S4?**
POTENTILLA FRUTICOSA/DESCHAMPSIA CESPITOSA	**G4**	**S4**
POTENTILLA FRUTICOSA/FESTUCA IDAHOENSIS	G4	S3
POTENTILLA FRUTICOSA/FESTUCA SCABRELLA	G4	S4
POTENTILLA FRUTICOSA/POTENTILLA OVINA	**G?**	**S?**
PSEUDOTSUGA MENZIESII/AGROPYRON SPICATUM	G4G5	S4
PSEUDOTSUGA MENZIESII/ARCTOSTAPHYLOS UVA-URSI	G4	S4
PSEUDOTSUGA MENZIESII/ARNICA CORDIFOLIA	**G5**	**S4**
PSEUDOTSUGA MENZIESII/CALAMAGROSTIS RUBESCENS	**G5**	**S5**
PSEUDOTSUGA MENZIESII/CAREX GEYERI	G5	S4
PSEUDOTSUGA MENZIESII/CERCOCARPUS LEDIFOLIUS	**G3?**	**S3?**
PSEUDOTSUGA MENZIESII/CORNUS STOLONIFERA	G3	S2
PSEUDOTSUGA MENZIESII/FESTUCA IDAHOENSIS	**G5**	**S4**
PSEUDOTSUGA MENZIESII/FESTUCA SCABRELLA	G4	S4
PSEUDOTSUGA MENZIESII/JUNIPERUS COMMUNIS	G5	S4
PSEUDOTSUGA MENZIESII/LINNAEA BOREALIS	G4	S4
PSEUDOTSUGA MENZIESII/PHYSOCARPUS MALVACEUS	**G5**	**S5**
PSEUDOTSUGA MENZIESII/SCREE	**G?**	**S?**
PSEUDOTSUGA MENZIESII/SPIRAEA BETULIFOLIA	G5	S4

TYPE NAME	**RANK**	
	G	**S**
PSEUDOTSUGA MENZIESII/SYMPHORICARPOS ALBUS	G5	S5
PSEUDOTSUGA MENZIESII/SYMPHORICARPOS OREOPHILUS	**G5**	**S3**
PSEUDOTSUGA MENZIESII/VACCINIUM CESPITOSUM	G5	S5
PSEUDOTSUGA MENZIESII/VACCINIUM GLOBULARE	G5	S5
PURSHIA TRIDENTATA/AGROPYRON SPICATUM	G4	S3
PURSHIA TRIDENTATA/FESTUCA IDAHOENSIS	G4G5	S3
PURSHIA TRIDENTATA/FESTUCA SCABRELLA	G4	S3
RHUS AROMATICA/AGROPYRON SPICATUM	G4	S4
RHUS AROMATICA/FESTUCA IDAHOENSIS	G3	S3
SALIX BEBBIANA	G4	S3

SALIX CANDIDA/CAREX ROSTRATA	G2	S2
SALIX DRUMMONDIANA	G3	S3
SALIX EXIGUA	**G5**	**S4**
SALIX GEYERIANA/CALAMAGROSTIS CANADENSIS	G5	S4
SALIX GEYERIANA/CAREX ROSTRATA	G5	S5
SALIX GEYERIANA/DESCHAMPSIA CESPITOSA	G4	S3
SALIX GEYERIANA/POA PRATENSIS	G5	S4
SALIX LASIANDRA	G3	S2
SALIX LUTEA/CALAMAGROSTIS CANADENSIS	G3	S3
SALIX PLANIFOLIA/CAREX AQUATILIS	G4	S3
SALIX PLANIFOLIA/CAREX NEBRASKENSIS	**G?**	**S?**
SALIX WOLFII/CAREX AQUATILIS	G4	S3
SALIX WOLFII/DESCHAMPSIA CESPITOSA	G4	S3
SARCOBATUS VERMICULATUS/AGROPYRON SMITHII	**G4**	**S4**
SARCOBATUS VERMICULATUS/DISTICHLIS STRICTA	**G4**	**S2**
SCIRPUS ACUTUS	G5	S4
STIPA COMATA/BOUTELOUA GRACILIS	**G5**	**S5**
STIPA COMATA/PSORLEA TENUIFLORA	**G?**	**S?**
TYPHA LATIFOLIA	G5	S5

Total Number of Community Types = 162
Number of community types with rank ≤ 3 = 58

APPENDIX B

LIST OF VASCULAR PLANT SPECIES (AND THEIR SIX-LETTER CODES) OCCURRING IN SAMPLE PLOTS

The coded nomenclature is primarily based on Hitchcock and Cronquist (1973) as modified by USDA Forest Service for Ecosystem Classification Handbook Appendix K (1987). Species arranged alphabetically within lifeform categories. Rare species are highlighted.

Summary statistics:

Total number of species = 549
Total number of plots = 252

SPECIES	CODE
TREES	
ABIES LASIOCARPA	ABILAS
JUNIPERUS SCOPULORUM	JUNSCO
PICEA ENGELMANNII	PICENG
PINUS ALBICAULIS	PINALB
PINUS CONTORTA	PINCON
PINUS FLEXILIS	PINFLE
PINUS PONDEROSA	PINPON
POPULUS TREMULOIDES	POPTRE
POPULUS TRICHOCARPA	POPTRI
PSEUDOTSUGA MENZIESI	PSEMEN
SHRUBS	
ACER GLABRUM	ACEGLA
ALNUS SINUATA	ALNSIN
AMELANCHIER ALNIFOLIA	AMEALN
AMELANCHIER UTAHENSIS	AMEUTA
ARCTOSTAPHYLOS UVA-URSI	ARCUVA
ARTEMISIA ARBUSCULA	ARTARB
ARTEMISIA CANA	ARTCAN
ARTEMISIA FRIGIDA	ARTFRI
ARTEMISIA LONGILOBA	ARTLON
ARTEMISIA NOVA	ARTNOV
ARTEMISIA TRIDENTATA	ARTTRI
A. TRIDENTATA ssp. TRIDENTATA	ARTTST
A. TRIDENTATA ssp. VASEYANA	ARTTSV
A. TRIDENTATA ssp. WYOMINGENSIS	ARTTSW
ARTEMISIA TRIPARTITA	ARTTRP
ATRIPLEX NUTTALLII	ATRNUT
BERBERIS REPENS	BERREP
BETULA OCCIDENTALIS	BETOCC
CERCOCARPUS LEDIFOLIUA	CERLED
CHRYSOTHAMNUS NAUSEOSUS	CHRNAU
CHRYSOTHAMNUS VISCIDIFLORUS	CHRVIS
CLEMATIS COLUMBIANA	CLECOL
CLEMATIS OCCIDENTALIS	CLEOCC
CORNUS STOLONIFERA	CORSTO
CORYPHANTHA VIVIPARA	CORVIV
ERIOGONUM MICROTHECUM	ERIMIC
EUROTIA LANATA	EURLAN
GUTIERREZIA SAROTHRAE	GUTSAR
HAPLOPAPPUS SUFFRUTICOSUS	HAPSUF

SPECIES	CODE
SHRUBS CONTINUED	
JUNIPERUS COMMUNIS	JUNCOM
LEPTODACTYLON PUNGENS	LEPPUN
LINNAEA BOREALIS	LINBOR
LONICERA INVOLUCRATA	LONINV
LONICERA UTAHENSIS	LONUTA
MENZIESIA FERRUGINEA	MENFER
OPUNTIA POLYACANTHA	OPUPOL
PHILADELPHUS LEWISII	PHILEW
POTENTILLA FRUTICOSA	POTFRU
PRUNUS VIRGINIANA	PRUVIR
PURSHIA TRIDENTATA	PURTRI
RHAMNUS ALNIFOLIA	RHAALN
RIBES AUREUM	RIBAUR
RIBES CEREUM	RIBCER
RIBES INERME	RIBINE
RIBES IRRIGUUM	RIBIRR
RIBES LACUSTRE	RIBLAC
RIBES MONTIGENUM	RIBMON
RIBES SETOSUM	RIBSET
RIBES VISCOSSISIMUM	RIBVIS
ROSA ACICULARIS	ROSACI
ROSA WOODSII	ROSWOO
RUBUS IDAEUS	RUBIDA
RUBUS PARVIFLORUS	RUBPAR
SALIX BEBBIANA	SALBEB
SALIX BOOTHII	SALBOO
SALIX EXIGUA	SALEXI
SALIX GEYERI	SALGEY
SALIX LASIANDRA	SALLAS
SALIX LEMMONII	SALLEM
SALIX PLANIFOLIA	SALPLA
SALIX RIGIDA	SALRIG
SAMBUCUS RACEMOSA	SAMRAC
SARCOBATUS VERMICULATUS	SARVER
SHEPHERDIA CANADENSIS	SHECAN
SPIRAEA BETULIFOLIA	SPIBET
SYMPHORICARPOS ALBUS	SYMALB
SYMPHORICARPOS OREOPHILUS	SYMORE
TETRADYMIA CANESCENS	TETCAN
VACCINIUM GLOBULARE	VACGLO
VACCINIUM SCOPARIUM	VACSCP

SPECIES	CODE
FORBS	
ACHILLEA MILLEFOLIUM	ACHMIL
ACTAEA RUBRA	ACTRUB
AGASTACHE CUSICKII	AGACUS (G3G4/S1, 3C)
AGOSERIS GLAUCA	AGOGLA
ALLIUM BREVISTYLUM	ALLBRE
ALLIUM CERNUUM	ALLCER
ALLIUM SCHOENOPRASUM	ALLSCH
ALLIUM TEXTILE	ALLTEX
ALYSSUM ALYSSOIDES	ALYALY
ALYSSUM DESERTORUM	ALYDES
ANDROSACE SEPTENTRIONALIS	ANDSEP
ANEMONE MULTIFIDA	ANEMUL
ANEMONE NUTTALLIANA	ANENUT
ANGELICA ARGUTA	ANGARG
ANGELICA ROSEANA	ANGROS
ANTENNARIA ANAPHALOIDES	ANTANA
ANTENNARIA CORYMBOSA	ANTCOR
ANTENNARIA DIMORPHA	ANTDIM
ANTENNARIA MICROPHYLLA	ANTMIC
ANTENNARIA PARVIFOLIA	ANTPAR
ANTENNARIA RACEMOSA	ANTRAC
ANTENNARIA UMBRINELLA	ANTUMB
APOCYNUM ANDROSAEMIFOLIUM	APOAND
AQUALEGIA FLAVESCENS	AQUFLA
AQUALEGIA FORMOSA	AQUFOR
ARABIS SPP.	ARABIS
ARABIS CONFINIS	ARACON
ARABIS DRUMMONDII	ARADRU
ARABIS FECUNDA	ARAFEC (G2/S2 C2)
ARABIS HOLBOELLII	ARAHOL
ARABIS NUTTALLII	ARANUT
ARABIS SPARSIFLORA	ARASPA
ARENARIA CONGESTA	ARECON
ARENARIA KINGII	AREKIN (G4/S1)
ARENARIA LATERIFLORA	ARELAT
ARENARIA NUTTALLII	ARENUT
ARENARIA OBTUSILOBA	AREOBT
ARENARIA RUBELLA	ARERUB
ARNICA CORDIFOLIA	ARECOR
ARNICA LATIFOLIA	ARNLAT
ARNICA SORORIA	ARNSOR
ARTEMISIA DRACUNCULUS	ARTDRA
ARTEMISIA LUDOVICIANA	ARTLUD
ASTER SPP.	ASTERX
ASTER ASCENDENS	ASTASC
ASTER CAMPESTRIS	ASTCAM
ASTER CONSPICUUS	ASTCON
ASTER ENGELMANNII	ASTENG
ASTER FALCATUS	ASTFAL
ASTER FOLIACEUS	ASTFOL
ASTER LAEVIS	ASTLAE
ASTER OCCIDENTALIS	ASTOCC
ASTER PANSUS	ASTPAN
ASTER PERELEGANS	ASTPER
ASTER SCOPULORUM	ASTSCO
ASTRAGALUS ABORIGINUM	ASTABO
ASTRAGALUS ADSURGENS	ASTADS
ASTRAGALUS AGRESTIS	ASTAGR
ASTRAGALUS ARGOPHYLLUS	ASTARG
ASTRAGALUS ATROPUBESCENS	ASTATR
ASTRAGALUS CERAMICUS V. APUS	ASTCER (G4T3/S1,3C)

SPECIES	CODE
FORBS CONTINUED	
ASTRAGALUS DRUMMONDII	ASTDRU
ASTRAGALUS FLEXUOSUS	ASTFLE
ASTRAGALUS GILVIFLORUS	ASTGIL
ASTRAGALUS KENTROPHYTA	ASTKEN
ASTRAGALUS LENTIGINOSUS	ASTLEN
ASTRAGALUS LEPTALEUS	ASTLEP
ASTRAGALUS MISER	ASTMIS
ASTRAGALUS PLATYTROPIS	ASTPLA
ASTRAGALUS PURSHII	ASTPUR
ATRIPLEX ARGENTEA	ATRARG
ATRIPLEX PATULA	ATRPAT
BALSAMORHIZA HOOKERI	BALHOO
BALSAMORHIZA SAGGITATA	BALSAG
BESSEYA WYOMINGENSIS	BESWYO
BRICKELLIA GRANDIFLORA	BRIGRA
BUPLEURUM AMERICANUM	BUPAME
CAMELINA MICROCARPA	CAMMIC
CAMPANULA ROTUNDIFOLIA	CAMROT
CARDAMINE BREWERI	CARBRW
CARDAMINE OLIGOSPERMA	CAROLI
CASTILLEJA FLAVA	CASFLA
CASTILLEJA LINARIAEFOLIA	CASLIN
CASTILLEJA MINATA	CASMIN
CASTILLEJA PALLESCENS	CASPAL
CASTILLEJA PULCHELLA	CASPUL
CASTILLEJA RHEXIFOLIA	CASRHE
CENTAUREA MACULOSA	CENMAC
CERASTIUM ARVENSE	CERARV
CHAENACTIS ALPINA	CHAALP
CHAENACTIS DOUGLASII	CHADOU
CHENOPODIUM ALBUM	CHEALB
CHENOPODIUM RUBRUM	CHERUB
CHRYSOPSIS VILLOSA	CHRVIL
CIRSIUM ARVENSE	CIRARV
CIRSIUM SCARIOSUM	CIRSCA
CIRSIUM SUBNIVEUM	CIRSUB
CIRSIUM UNDULATUM	CIRUND
CLEMATIS HIRSUTISSIM	CLEHIR
COMANDRA UMBELLATA	COMUMB
CORYPHANTHA VIVIPARA	CORVIV
CREPIS ACUMINATA	CREACU
CREPIS ATRIBARBA	CREATR
CREPIS MODOCENSIS	CREMOD
CREPIS RUNCINATA	CRERUN
CRYPTANTHA CELOSIODES	CRYCEL
CRYPTANTHA FENDLERI	CRYFEN (G4/S1)
CRYPTANTHA INTERRUPTA	CRYINT
CRYPTANTHA SPICULIFERA	CRYSPI
CYMOPTERUS BIPINNATUS	CYMBIP
DELPHINIUM BICOLOR	DELBIC
DELPHINIUM GLAUCUM	DELGLA
DELPHINIUM OCCIDENTALE	DELOCC
DESCURAINIA PINNATA	DESPIN
DESCURAINIA RICHARDSONII	DESRIC
DESCURAINIA SOPHIA	DESSOP
DISPORUM TRACHYCARPUM	DISTRA
DODECATHEON CONJUGENS	DODCON
DODECATHEON PULCHELLUM	DODPUL
DOUGLASIA MONTANA	DOUMON
DRABA CANA	DRACAN
DRABA DENSIFOLIA	DRADEN (G5/S2)
DRABA NEMOROSA	DRANEM

SPECIES	CODE
FORBS CONTINUED	
DRABA OLIGOSPERMA	DRAOLI

DRABA PRAEALTA	DRAPRA
EPILOBIUM ALPINUM	EPIALP
EPILOBIUM ANGUSTIFOLIUM	EPIANG
EPILOBIUM PALUSTRE	EPIPAL
ERIGERON CAESPITOSUS	ERICAE
ERIGERON COMPOSITUS	ERICOM
ERIGERON CORYMBOSUS	ERICOR
ERIGERON GRACILIS	ERIGRA
ERIGERON LONCHOPHYLLUS	ERILON
ERIGERON OCHROLEUCUS	ERIOCH
ERIGERON PUMILIS	ERIPUM
ERIGERON TWEEDYI	ERITWE
ERIGERON URSINUS	ERIURS
ERIOGONUM CAESPITOSUM ERICAS	
ERIOGONUM FLAVUM	ERIFLA
ERIOGONUM MANCUM	ERIMAN
E. OVALIFOLIUM V. CELSUM	ERIOVC (G5T4/S2)
E. OVALIFOLIUM V. MACRO.	ERIOVM
ERIOGONUM UMBELLATUM	ERIUMB
ERITRICHIUM NANUM	ERINAN
ERYSIMUM ASPERUM	ERYASP
ERYSIMUM INCONSPICUUM ERYINC	
ERYSIMUN REPANDUM	ERYREP
ERYTHRONIUM GRANDIFLORUM	ERYGRA
FRAGARIA VIRGINIANA	FRAVIR
FRAGARIA VESCA	FRAVES
FRASERA SPECIOSA	FRASPE
FRITILLARIA ATROPURPUREA	FRIATR
GAILLARDIA ARISTATA	GAIARI
GALIUM BOREALE	GALBOR
GALIUM TRIFIDUM	GALTRF
GALIUM TRIFLORUM	GALTRI
GAURA COCCINEA	GAUCOC
GAYOPHYTUM DIFFUSUM	GAYDIF
GAYOPHYTUM RAMOSISSIMUM	GAYRAM
GENTIANA AFFINIS	GENAFF
GENTIANA AMARELLA	GENAMA
GENTIANA AQUATICA	GENAQU
GERANIUM RICHARDSONII	GERRIC
GERANIUM VISCOSSISIMUM	GERVIS
GEUM MACROPHYLLUM	GEUMAC
GEUM TRIFLORUM	GEUTRI
GILIA SPICATA	GILSPI
GLAUX MARITIMA	GLAMAR
GOODYERA OBLONGIFOLIA GOOOBL	
GRINDELIA SQUARROSA	GRISQU
HACKELIA FLORIBUNDA	HACFLO
HALIMOLOBOS VIRGATA	HALVIR
HAPLOPAPPUS ACAULIS	HAPACA
HAPLOPAPPUS ARMERIOIDES	HAPARM
HAPLOPAPPUS INTEGRIFOLIUS	HAPINT
HAPLOPAPPUS UNIFLORUS	HAPUNI
HELIANTHELLA UNIFLORA	HELUNI
HELIANTHUS PETIOLARIS	HELPET
HEDYSARUM BOREALE	HEDBOR
HEDYSARUM SULPHURESCENS	HEDSUL
HELIANTHUS PETIOLARIS	HELPET
HEUCHERA GROSSULARIIFOLIA	HEUGRO
HEUCHARA PARVIFOLIA	HEUPAR
HEUCHARA RICHARDSONII	HEURIC
HIERACIUM ALBIFLORUM	HIEALB
HYMENOPAPPUS FILIFOLIUS	HYMFIL

SPECIES	CODE
FORBS CONTINUED	
IPOMOPSIS CONGESTA	IPOCON
IPOMOPSIS CREBRIFOLIA	IPOCRE
IRIS MISSOURIENSIS	IRIMIS
IVESIA GORDONII	IVEGOR
LAPPULA REDOWSKII	LAPRED
LEPIDIUM VIRGINICUM	LEPVIR
LESQUERELA ALPINA	LESALP
LESQUERELA CARINATA	LESCAR
LESQUERELLA PAYSONII?	LESPAY (G4/S1)
LEWISIA REDIVIVA	LEWRED
LIGUSTICUM SPP.	LIGUST
LIGUSTICUM FILICINUM	LIGFIL
LINUM LEWISII	LINLEW
LITHOSPERMUM INCISUM	LITINC
LITHOSPERMUM RUDERALE	LITRUD
LOMATIUM ATTENUATUM	LOMATT
LOMATIUM COUS	LOMCOU
LOMATIUM FOENICULACEUM	LOMFOE
LOMATIUM TRITERNATUM	LOMTRI
LOMATOGONIUM ROTATUM	LOMROT
LUPINUS ARGENTEUS	LUPARG
LUPINUS LEUCOPHYLLUS	LUPLEU
LUPINUS SERICEUS	LUPSER
LYGODESMIA JUNCEA	LYGJUN
MACHAERANTHERA CANESCENS	MACCAN
MELILOTUS OFFICINALIS	MELOFF
MENTHA ARVENSIS	MENARV
MENTZELIA ALBICAULIS	MENALB
MENTZELIA DECAPETALA	MENDEC
MENTZELIA DISPERSA	MENDIS
MENTZELIA LAEVICAULIS	MENLAE
MERTENSIA CILIATA	MERCIL
MERTENSIA LANCEOLATA	MERLAN
MERTENSIA OBLONGIFOLIA MEROBL	
MERTENSIA VIRIDIS	MERVIR
MICROSERIS NIGRESENS	MICNIG
MICROSERIS NUTANS	MICNUT
MIMULIS GUTTATUS	MIMGUT
MIRABILIS LINEARIS	MIRLIN
MITELLA STAUROPETALA	MITSTA
MUSINEON DIVARICATUM	MUSDIV
MYOSOTIS ALPESTRIS	MYOALP
MYOSOTIS ARVENSIS	MYOARV
OENOTHERA CAESPITOSA	OENCAE
OPUNTIA FRAGILIS	OPUFRA
OPUNTIA POLYACANTHA	OPUPOL
OROBANCHE CORYMBOSA	OROCOR
OROBANCHE FASCICULATA OROFAS	
OROBANCHE LUDOVICIANA	OROLUD
ORTHOCARPUS LUTEUS	ORTLUD
OSMORHIZA CHILENSIS	OSMCHI
OSMORHIZA DEPAUPERATA	OSMDEP
OSMORHIZA OCCIDENTALIS	OSMOCC
OXYTROPUS BESSEYI	OXYBES
OXYTROPUS CAMPESTRIS	OXYCAM
OXYTROPUS LAGOPUS	OXYLAG
OXYTROPUS SERICEA	OXYSER
OXYTROPUS VISCIDA	OXYVIS
PARNASSIA FIMBRIATA	PARFIM
PARNASSIA PALUSTRIS	PARPAL
PARONYCHIA SESSILIFLORA	PARSES
PEDICULARIS BRACTEOSA	PEDBRA
PEDICULARIS CONTORTA	PEDCON

SPECIES	CODE
FORBS CONTINUED	
PEDICULARIS GROENLANDICA	PEDGRO
PEDICULARIS RACEMOSA	PEDRAC
PEDICULARIS PARRYI	PEDPAR
PEDIOCACTUS SIMPSONII	PEDSIM
PENSTEMON ARIDUS	PENARI
PENSTEMON ATTENUATUS	PENATT

PENSTEMON DIPHYLLUS	PENDIP
PENSTEMON ERIANTHERUS	PENERI
PENSTEMON PROCERUS	PENPRO
PENSTEMOM RADICOSUS	PENRAD
PERIDERIDIA GAIRDNERI	PERGAI
PETROPHYTON CAESPITOSUM	PETCAE
PHACELIA FRANKLINII	PHAFRA
PHACELIA GLANDULOSA	PHAGLA
PHACELIA HASTATA	PHAHAS
PHACELIA HETEROPHYLLA	PHAHET
PHACELIA INCANA	PHAINC
PHACELIA LINEARIS	PHALIN
PHLOX DIFFUSA	PHLDIF
PHLOX HOODII	PHLHOO
PHLOX LONGIFOLIA	PHLLON
PHLOX KEYSEYI	PHLKEY
PHLOX MULTIFLORA	PHLMUL
PHLOX MUSCOIDES	PHLMUS
PHLOX PULVINATA	PHLPUL
PHYSARIA GEYERI	PHYGEY
PLANTAGO PATAGONICA	PLAPAT
POLYGONUM BISTORTOIDES	POLBIS
POLYGONUM DOUGLASII	POLDOU
POLYGONUM RAMOSISSIMUM	POLRAM
POTENTILLA ARGUTA	POTARG
POTENTILLA ANSERINA	POTANS
POTENTILLA CONCINNA	POTCON
POTENTILLA DIVERSIFOLIA	POTDIV
POTENTILLA GLANDULOSA	POTGLA
POTENTILLA GRACILIS	POTGRA
POTENTILLA HIPPIANA	POTHIP
POTENTLLA OVINA	POTOVI
POTENTILLA PENSYLVANICA	POTPEN
PRIMULA INCANA	PRIINC
PSORALEA TENUIFLORA	PSOTEN
PYROLA ASARIFOLIA	PYRASA
PYROLA SECUNDA	PYRSEC
RANUNCULUS CYMBALARIS	RANCYM
RANUNCULUS JOVIS	RANJOV
RANUNCULUS NATANS	RANNAT
RANUNCULUS UNCINATUS	RANUNC
RUMEX SPP.	RUMEXX
RUMEX OCCIDENTALIS	RUMOCC
SAXIFRAGA BRONCHIALIS	SAXBRO
SAXIFRAGA RHOMBOIDEA	SAXRHO
SCHOENOCRAMBE LINIFOLIA	SCHLIN
SEDUM LANCEOLATUM	SEDLAN
SENECIO CANUS	SENCAN
SENECIO CRASSULUS	SENCRA
SENECIO DEBILIS	SENDEB
SENECIO DIMORPHOPHYLLUS	SENDIM
SENECIO INTEGERRIMUS	SENINT
SENECIO PAUCIFLORUS	SENPAU
SENECIO SERRA	SENSER
SENECIO SPHAEROCEPHALUS	SENSPH
SENECIO STREPTANTHIFOLIUS	SENSTR

SPECIES	CODE
FORBS CONTINUED	
SILENE OREGANA	SILORE
SIUM SUAVE	SIUSUA
SISYRINCHIUM ANGUSTIFOLIUM	SISANG
SISYRINCHIUM MONTANUM	SISMON
SMILACINA RACEMOSA	SMIRAC
SMILACINA STELLATA	SMISTE
SOLIDAGO GIGANTEA	SOLGIG
SOLIDAGO MISSOURIENSIS	SOLMIS
SOLIDAGO MULTIRADIATA	SOLMUL
SOLIDAGO NANA	SOLNAN
SPHAERALCEA COCCINEA	SPHCOC
STANLEYA PINNATA	STAPIN
STANLEYA VIRIDIFLORA	STAVIR
STELLARIA LONGIPES	STELON
STEPHANOMERIA RUNCINATA	STERUN
SYNTHYRIS PINNATIFIDA	SYNPIN
SUAEDA DEPRESSA	SUADEP
TARAXACUM CERATOPHORUM	TARCER
TARAXACUM LAEVIGATUM	TARLAE
TARAXACUM OFFICINALE	TAROFF
THALICTRUM OCCIDENTALE	THAOCC
THERMOPSIS MONTANA	THEMON
THLASPI ARVENSE	THLARV
THLASPI PARVIFLORUM	THLPAR
TOWNSENDIA CONDENSATA	TOWCON
TOWNSENDIA HOOKERI	TOWHOO
TOWNSENDIA MONTANA	TOWMON
TOWNSENDIA NUTTALLII	TOWNUT
TOWNSENDIA PARRYI	TOWPAR
TRAGOPOGON DUBIUS	TRADUB
TRAGOPOGON PRATENSIS	TRAPRA
TRIBULUS TERRESTRIS	TRITER
TRIFOLIUM LONGIPES	TRILON
TRIFOLIUM REPENS	TRIREP
TRIGLOCHIN MARITIMUM	TRIMAR
TRIGLOCHIN PALUSTRE	TRIPAL
URTICA DIOICA	URTDIO
UTRICULARIA VULGARIS	UTRVUL
VALERIANA ACUTILOBA	VALACU
VALERIANA DIOICA	VALDIO
VALERIANA EDULIS	VALEDU
VALERIANA OCCIDENTALIS	VALOCC
VERBASCUM THAPSUS	VERTHA
VERONICA AMERICANA	VERAME
VERONICA BILOBA	VERBIL
VICIA AMERICANA	VICAME
VIOLA ADUNCA	VIOADU
VIOLA NUTTALLII	VIONUT
VIOLA NEPHROPHYLLA	VIONEP
VIOLA NUTTALLII	VIONUT
VIOLA ORBICULATA	VIOORB
XEROPHYLLUM TENAX	XERTEN
ZIGADENUS ELEGANS	ZIGELE
ZIGADENUS VENENOSUS	ZIGVEN

GRAMINOIDS

AGROPYRON CANINUM	AGRCAN
AGROPYRON DASYSTACHYUM	AGRDAS
AGROPYRON SMITHII	AGRSMI
AGROPYRON SPICATUM	AGRSPI
AGROSTIS ALBA	AGRALB

SPECIES	CODE
GRAMINOIDS CONTINUED	
AGROSTIS SCABRA	AGRSCA
ARISTIDA LONGISETA	ARILON
BOUTELOUA GRACILIS	BOUGRA
BROMUS SPP.	BROMUS
BROMUS CARINATUS	BROCAR
BROMUS CILIATUS	BROCIL
BROMUS INERMIS	BROINE
BROMUS TECTORUM	BROTEC
BROMUS VULGARIS	BROVUL
CALAMAGROSTIS CANADENSIS	CALCAN
CALAMAGROSTIS INEXPANSA	CALINE
CALAMAGROSTIS MONTANENSIS	CALLMON

CALAMAGROSTIS PURPURASCENS	CALPUR
CALAMAGROSTIS RUBESCENS	CALRUB
CAREX AQUATILIS	CARAQU
CAREX ATHROSTACHYA	CARATO
CAREX AUREA	CARAUR
CAREX DISPERMA	CARDIS
CAREX DOUGLASII	CARDOU
CAREX FILIFOLIA	CARFIL
CAREX GEYERI	CARGEY
CAREX HELIOPHILA	CARHEL
CAREX MICROPTERA	CARMIC
CAREX NEBRASKENSIS	CARNEB
CAREX OBTUSATA	CAROBT
CAREX PARRYANA	CARPAR
CAREX PAUCIFLORA	CARPAI
CAREX PETASATA	CARPET
CAREX PHAEOCEPHALA	CARPHA
CAREX PRAEGRACILIS	CARPRA
CAREX PRATICOLA	CARPRT
CAREX RAYNOLDSII	CARRAY
CAREX ROSSII	CARROI
CAREX ROSTRATA	CARROS
CAREX RUPESTRIS	CARRUP
CAREX SCIRPOIDEA	CARSCI
CAREX SIMULATA	CARSIM
CAREX STENOPHYLLA	CARSTE
CAREX VESICARIA	CARVES
CINNA LATIFOLIA	CINLAT
DANTHONIA INTERMEDIA	DANINT
DANTHONIA UNISPICATA	DANUNI
DESCHAMPSIA CESPITOSA	DESCES
DISTICHLIS STRICTA	DISSTR
ELEOCHARIS PALUSTRIS	ELEPAL
ELEOCHARIS PAUCIFLORA	ELEPAU
ELYMUS CINEREUS	ELYCIN
ELYMUS GLAUCUS	ELYGLA
ELYMUS REPENS	ELYREP
FESTUCA IDAHOENSIS	FESIDA
FESTUCA OCCIDENTALIS	FESOCC
FESTUCA OVINA	FESOVI
FESTUCA RUBRA	FESRUB
FESTUCA SCABRELLA	FESSCA
GLYCERIA STRIATA	GLYSTR
HESPEROCHLOA KINGII	HESKIN
HORDEUM BRACHYANTHERUM	HORBRA
HORDEUM JUBATUM	HORJUB
JUNCUS BALTICUS	JUNBAL
JUNCUS EFFUSUS	JUNEFF
JUNCUS LONGISTYLIS	JUNLON
KOELERIA CRISTATA	KOECRI

SPECIES	CODE
GRAMINOIDS CONTINUED	
MELICA BULBOSA	MELBUL
MELICA SUBULATA	MELSUB
MUHLENBERGIA CUSPIDATA	MUHCUS
MUHLENBERGIA FILIFORMIS	MUHFIL
MUHLENBERGIA RICHARDSONIS	MUHRIC
ORYZOPSIS HYMENOIDES	ORYHYM
PHALARIS ARUNDINACEA	PHAARU
PHLEUM ALPINUM	PHLALP
PHLEUM PRATENSE	PHLPRA
POA ALPINA	POAALP
POA ARIDA	POAARI
POA CUSICKII	POACUS
POA FENDLERIANA	POAFEN
POA GLAUCIFOLIA	POAGLA
POA GRACILLIMA	POAGRA
POA INTERIOR	POAINT
POA JUNCIFOLIA	POAJUN
POA NEVADENSIS	POANEV
POA NERVOSA	POANER
POA PALUSTRIS	POAPAL
POA PRATENSIS	POAPRA
POA RUPICOLA	POARUP
POA SANDBERGII	POASAN
POA SCABRELLA	POASCA
POA TRIVIALIS	POATRI
PUCCINELLIA DISTANS	PUCDIS
SITANION HYSTRIX	SITHYS
STIPA COMATA	STICOM
STIPA OCCIDENTALIS	STIOCC
STIPA RICHARDSONII	STIRIC
STIPA SPARTEA	STISPA
STIPA VIRIDULA	STIVIR
TRISETUM SPICATUM	TRISPI

SPECIES	CODE
FERNS & ALLIES	
CHEILANTHES FEEI	CHEFEE
CYSTOPTERIS FRAGILIS	CYSFRA
EQUISETUM ARVENSE	EQUARV
EQUISETUM HYEMALE	EQUHYE
EQUISETUM LAEVIGATUM	EQULAE
SELAGINELLA DENSA	SELDEN
WOODSIA OREGANA	WOOORE
WOODSIA SCOPULINA	WOOSCO

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ABILAS/THAOCC N = 7	*ABILAS/CALRUB N = 1	*ABILAS/CARGEY N = 2	*ABILAS/ARNCOR N = 2	*PINALB-ABILAS N = 2	*ABILAS/RIBMON N = 3	*PICEA/EQUARV N = 1
***** TREES *****							
ABILAS	86 (17) [3-40]	100 (20) [20-20]	100 (7) [3-10]	100 (25) [20-30]	100 (1) [1- 1]	100 (24) [3-40]	0 (0) [0- 0]
JUNSCO	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
PICENG	29 (7) [3-10]	0 (0) [0- 0]	0 (0) [0- 0]	50 (10) [10-10]	50 (1) [1- 1]	67 (6) [1-10]	100 (80) [80-80]
PINALB	14 (10) [10-10]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	100 (20) [10-30]	67 (35) [20-50]	0 (0) [0- 0]
PINCON	14 (60) [60-60]	100 (40) [40-40]	0 (0) [0- 0]	50 (40) [40-40]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
PINFLE	14 (20) [20-20]	0 (0) [0- 0]	50 (20) [20-20]	0 (0) [0- 0]	0 (0) [0- 0]	33 (10) [10-10]	0 (0) [0- 0]
PINPON	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
POPTRE	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
POPTRI	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
PSEMEN	71 (44) [1-70]	100 (20) [20-20]	50 (70) [70-70]	100 (25) [20-30]	50 (10) [10-10]	33 (10) [10-10]	0 (0) [0- 0]
SALEXI	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
***** SHRUBS *****							
ACEGLA	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
AMEALN	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
ARCUVA	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	50 (1) [1- 1]	0 (0) [0- 0]	0 (0) [0- 0]
ARTFRI	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
ARTTRI	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
ARTTSV	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
BERREP	29 (1) [1- 1]	100 (1) [1- 1]	50 (3) [3- 3]	50 (1) [1- 1]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
CERLED	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
JUNCOM	14 (3) [3- 3]	0 (0) [0- 0]	50 (1) [1- 1]	0 (0) [0- 0]	100 (2) [1- 3]	33 (10) [10-10]	0 (0) [0- 0]
LINBOR	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	100 (20) [20-20]
PHILEW	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
PHYMAL	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
PRUVIR	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
PURVIR	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
RIBCER	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
RIBLAC	14 (1) [1- 1]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
RIBLUC	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
RIBMON	14 (1) [1- 1]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	100 (2) [1- 3]	0 (0) [0- 0]
ROSACI	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
ROSWOO	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
SHECAN	57 (2) [1- 3]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	50 (1) [1- 1]	33 (10) [10-10]	0 (0) [0- 0]
SPIBET	29 (1) [1- 1]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
SYMALB	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
SYMOCC	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
SYMORE	43 (1) [1- 1]	0 (0) [0- 0]	50 (3) [3- 3]	0 (0) [0- 0]	50 (1) [1- 1]	0 (0) [0- 0]	0 (0) [0- 0]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ABILAS/THAOCC N = 7	*ABILAS/CALRUB N = 1	*ABILAS/CARGEY N = 2	*ABILAS/ARNCOR N = 2	*PINALB-ABILAS N = 2	*ABILAS/RIBMON N = 3	*PICEA/EQUARV N = 1
***** GRAMINOIDS *****							
AGRCAN	14 (3)[3- 3]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRSPI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]	0 (0)[0- 0]
ARILON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BOUGRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROCAR	14 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]
BROINE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (10)[10-10]
CALPUR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (20)[20-20]	0 (0)[0- 0]	0 (0)[0- 0]
CALRUB	71 (11)[1-40]	100 (40)[40-40]	0 (0)[0- 0]	50 (40)[40-40]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARFIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARGEY	43 (7)[1-10]	0 (0)[0- 0]	50 (70)[70-70]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARROI	14 (1)[1- 1]	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	100 (1)[1- 1]	33 (10)[10-10]	0 (0)[0- 0]
CARROS	14 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARRST	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]
CARSTE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ELYGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]
ELYREP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FESIDA	14 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FESOCC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HESKIN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
KOECRI	14 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]
ORYHYM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ORYMIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POA	14 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAALP	14 (1)[1- 1]	0 (0)[0- 0]	50 (30)[30-30]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
POACUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POANER	29 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPRA	14 (10)[10-10]	100 (10)[10-10]	50 (1)[1- 1]	50 (10)[10-10]	0 (0)[0- 0]	67 (6)[1-10]	0 (0)[0- 0]
POASAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
POASEC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SITHYS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	33 (10)[10-10]	0 (0)[0- 0]
STICOM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ABILAS/THAOCC N = 7	*ABILAS/CALRUB N = 1	*ABILAS/CARGEY N = 2	*ABILAS/ARNCOR N = 2	*PINALB-ABILAS N = 2	*ABILAS/RIBMON N = 3	*PICEA/EQUARV N = 1
***** FORBS *****							
ACHMIL	14 (1)[1- 1]	0 (0)[0- 0]	50 (10)[10-10]	0 (0)[0- 0]	100 (1)[1- 1]	33 (3)[3- 3]	0 (0)[0- 0]
ACTRUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (20)[20-20]
ALLBRE	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTANA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTMIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTRAC	57 (4)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTUMB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AQUFLA	43 (2)[1- 3]	100 (1)[1- 1]	50 (1)[1- 1]	50 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
AQUFOR	43 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARECON	14 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (2)[1- 3]	0 (0)[0- 0]
ARNCOR	86 (14)[3-30]	100 (20)[20-20]	100 (6)[1-10]	100 (11)[1-20]	0 (0)[0- 0]	67 (12)[3-20]	0 (0)[0- 0]
ARNLAT	14 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
ASTCON	71 (2)[1- 3]	100 (1)[1- 1]	50 (1)[1- 1]	100 (1)[1- 1]	0 (0)[0- 0]	33 (3)[3- 3]	0 (0)[0- 0]
ASTENG	57 (14)[1-30]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTERX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTMIS	43 (2)[1- 3]	0 (0)[0- 0]	100 (6)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTPER	14 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CYMBIP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DRADEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
EQUARV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (50)[50-50]
ERYGRA	57 (8)[3-10]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FRAVES	43 (4)[1-10]	100 (1)[1- 1]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FRAVIR	14 (1)[1- 1]	0 (0)[0- 0]	50 (3)[3- 3]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	100 (10)[10-10]
GALBOR	57 (2)[1- 3]	100 (1)[1- 1]	50 (3)[3- 3]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]
GALTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GERRIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]
GERVIS	57 (2)[1- 3]	100 (1)[1- 1]	50 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]
GEUMAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GEUTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HEDSUL	14 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HYMACA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LIGFIL	29 (1)[1- 1]	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LIGUST	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPARG	29 (2)[1- 3]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]	0 (0)[0- 0]
MEROBL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MITSTA	71 (1)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OPUPOL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OSMCHI	100 (3)[1-10]	100 (3)[3- 3]	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OSMDEP	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	33 (3)[3- 3]	100 (1)[1- 1]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ABILAS/THAOCC N = 7	*ABILAS/CALRUB N = 1	*ABILAS/CARGEY N = 2	*ABILAS/ARNCOR N = 2	*PINALB-ABILAS N = 2	*ABILAS/RIBMON N = 3	*PICEA/EQUARV N = 1
***** FORBS CONTINUED *****							
PEDRAC	29 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
PETCAE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLALY	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLHOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLMUL	14 (3)[3- 3]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLPUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
POTDIV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
SELDEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENDIM	0 (0)[0- 0]	0 (0)[0- 0]	50 (10)[10-10]	0 (0)[0- 0]	50 (1)[1- 1]	33 (10)[10-10]	0 (0)[0- 0]
SENSER	14 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SMIRAC	14 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SMISTE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (10)[10-10]
SOLGIG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SOLMUL	14 (1)[1- 1]	0 (0)[0- 0]	50 (10)[10-10]	0 (0)[0- 0]	50 (1)[1- 1]	33 (1)[1- 1]	0 (0)[0- 0]
TAROFF	14 (1)[1- 1]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]
THAOCC	86 (8)[3-20]	100 (3)[3- 3]	100 (6)[1-10]	100 (3)[3- 3]	0 (0)[0- 0]	33 (1)[1- 1]	100 (3)[3- 3]
URTDIO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VALACU	14 (10)[10-10]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VALDIO	43 (4)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*PICEA/GALTRI N = 1	*PICEA/SENSTR N = 2	*PSEMEN/SCREE N = 2	*PSEMEN/PHYMAL N = 2	*PSEMEN/CALRUB N = 3	*PSEMEN/SYMORE N = 3	*PSEMEN/ARNCOR N = 2
***** TREES *****							
ABILAS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
JUNSCO	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]	100 (11)[1-20]	33 (1)[1- 1]	33 (1)[1- 1]	50 (1)[1- 1]
PICENG	100 (40)[40-40]	100 (12)[3-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PINALB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PINCON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PINFLE	0 (0)[0- 0]	100 (22)[3-40]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PINPON	0 (0)[0- 0]	0 (0)[0- 0]	50 (10)[10-10]	50 (20)[20-20]	0 (0)[0- 0]	67 (2)[1- 3]	0 (0)[0- 0]
POPTRE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POPTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PSEMEN	100 (3)[3- 3]	50 (10)[10-10]	100 (55)[40-70]	100 (55)[40-70]	67 (75)[60-90]	100 (57)[40-70]	100 (65)[60-70]
SALEXI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** SHRUBS *****							
ACEGLA	0 (0)[0- 0]	0 (0)[0- 0]	100 (15)[10-20]	100 (25)[20-30]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AMEALN	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]
ARCUVA	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTFRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	33 (1)[1- 1]	0 (0)[0- 0]
ARTTSV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]
BERREP	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	50 (20)[20-20]	33 (30)[30-30]	33 (20)[20-20]	0 (0)[0- 0]
CERLED	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
JUNCOM	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	50 (10)[10-10]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]
LINBOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHILEW	0 (0)[0- 0]	0 (0)[0- 0]	50 (10)[10-10]	50 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHYMAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (25)[10-40]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PRUVIR	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PURVIR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBCER	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	67 (1)[1- 1]	0 (0)[0- 0]
RIBLAC	100 (20)[20-20]	50 (1)[1- 1]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBLUC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBMON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	50 (1)[1- 1]
ROSACI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ROSWOO	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SHECAN	0 (0)[0- 0]	50 (1)[1- 1]	50 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	67 (7)[3-10]	0 (0)[0- 0]
SPIBET	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (11)[1-20]	33 (10)[10-10]	0 (0)[0- 0]	50 (3)[3- 3]
SYMALB	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	50 (3)[3- 3]	33 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
SYMOCC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]	0 (0)[0- 0]
SYMORE	100 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (2)[1- 3]	100 (2)[1- 3]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*PICEA/GALTRI * N = 1	*PICEA/SENSTR * N = 2	*PSEMEN/SCREE * N = 2	*PSEMEN/PHYMAL * N = 2	*PSEMEN/CALRUB * N = 3	*PSEMEN/SYMORE * N = 3	*PSEMEN/ARNCOR * N = 2
*****	GRAMINOIDS *****						
AGRCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	67 (1)[1- 1]	0 (0)[0- 0]
AGRSPI	0 (0)[0- 0]	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]	67 (2)[1- 3]	67 (6)[1-10]	0 (0)[0- 0]
ARILON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BOUGRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROCAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROINE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALPUR	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]
CALRUB	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	50 (3)[3- 3]	100 (30)[10-60]	0 (0)[0- 0]	0 (0)[0- 0]
CARFIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARGEY	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (10)[10-10]	33 (3)[3- 3]	0 (0)[0- 0]
CARPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARROI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]
CARROS	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
CARRST	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSTE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ELYGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ELYREP	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FESIDA	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	67 (15)[10-20]	33 (1)[1- 1]	0 (0)[0- 0]
FESOCC	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (10)[10-10]	50 (1)[1- 1]
HESKIN	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]
KOECRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	33 (1)[1- 1]	0 (0)[0- 0]
ORYHYM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ORYMIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAALP	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]
POACUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POANER	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (2)[1- 3]	33 (1)[1- 1]	100 (6)[1-10]
POAPAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPRA	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (20)[20-20]	50 (1)[1- 1]
POASAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POASEC	100 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SITHYS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (10)[10-10]	0 (0)[0- 0]
STICOM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*PICEA/GALTRI N = 1	*PICEA/SENSTR N = 2	*PSEMEN/SCREE N = 2	*PSEMEN/PHYMAL N = 2	*PSEMEN/CALRUB N = 3	*PSEMEN/SYMORE N = 3	*PSEMEN/ARNCOR N = 2
***** FORBS *****							
ACHMIL	100 (1)[1- 1]	50 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	67 (1)[1- 1]	67 (1)[1- 1]	0 (0)[0- 0]
ACTRUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ALLBRE	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTANA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]
ANTMIC	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	33 (1)[1- 1]	0 (0)[0- 0]
ANTRAC	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]	100 (1)[1- 1]
ANTUMB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]
AQUFLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AQUFOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]
ARECON	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]	0 (0)[0- 0]
ARNCOR	100 (1)[1- 1]	50 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	67 (1)[1- 1]	67 (25)[20-30]	100 (30)[20-40]
ARNLAT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTCON	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	50 (20)[20-20]	33 (10)[10-10]	33 (3)[3- 3]	0 (0)[0- 0]
ASTENG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTERX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
ASTMIS	0 (0)[0- 0]	100 (6)[1-10]	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	67 (2)[1- 3]	100 (1)[1- 1]
ASTPER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]	0 (0)[0- 0]
CYMBIP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DRADEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
EQUARV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERYGRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FRAVES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (6)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]
FRAVIR	100 (3)[3- 3]	50 (1)[1- 1]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]
GALBOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GALTRI	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GERRIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GERVIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GEUMAC	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]
GEUTRI	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	33 (3)[3- 3]	50 (1)[1- 1]
HEDSUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]
HYMACA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LIGFIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LIGUST	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPARG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]
MEROBL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]
MITSTA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OPUPOL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OSMCHI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]
OSMDEP	100 (3)[3- 3]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*PICEA/GALTRI * N = 1	*PICEA/SENSTR * N = 2	*PSEMEN/SCREE * N = 2	*PSEMEN/PHYMAL * N = 2	*PSEMEN/CALRUB * N = 3	*PSEMEN/SYMORE * N = 3	*PSEMEN/ARNCOR * N = 2
***** FORBS CONTINUED *****							
PEDRAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PETCAE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLALY	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLHOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLMUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (10)[10-10]	0 (0)[0- 0]
PHLPUL	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTDIV	100 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	50 (1)[1- 1]
SELDEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENDIM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENSER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SMIRAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (11)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SMISTE	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
SOLGIG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SOLMUL	0 (0)[0- 0]	100 (6)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	33 (10)[10-10]	100 (2)[1- 3]	0 (0)[0- 0]
TAROFF	100 (1)[1- 1]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	33 (1)[1- 1]	33 (1)[1- 1]	50 (1)[1- 1]
THAOCC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]	50 (10)[10-10]
URTDIO	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VALACU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VALDIO	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]	50 (3)[3- 3]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*PSEMEN/CERLED * N = 5	*PSEMEN/FESIDA * N = 2	*PINFLE/CERLED * N = 2	*PINFLE/FESIDA * N = 1	*PINFLE/JUNCOM * N = 1	*PINFLE/AGRSPI * N = 1	*PINALB/FESIDA * N = 1
***** TREES *****							
ABILAS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]
JUNSCO	40 (6)[1-10]	50 (1)[1- 1]	100 (45)[20-70]	0 (0)[0- 0]	100 (1)[1- 1]	100 (10)[10-10]	0 (0)[0- 0]
PICENG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PINALB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PINCON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (50)[50-50]
PINFLE	0 (0)[0- 0]	100 (7)[3-10]	100 (20)[10-30]	100 (30)[30-30]	100 (40)[40-40]	100 (3)[3- 3]	0 (0)[0- 0]
PINPON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POPTRE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POPTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PSEMEN	100 (24)[10-60]	100 (30)[30-30]	100 (2)[1- 3]	100 (20)[20-20]	100 (20)[20-20]	100 (3)[3- 3]	0 (0)[0- 0]
SALEXI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** SHRUBS *****							
ACEGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AMEALN	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARCUVA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (70)[70-70]	0 (0)[0- 0]	0 (0)[0- 0]
ARTFRI	80 (2)[1- 3]	0 (0)[0- 0]	100 (6)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]
ARTTRI	20 (20)[20-20]	50 (40)[40-40]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]
ARTTSV	40 (11)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]
BERREP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CERLED	100 (42)[10-70]	0 (0)[0- 0]	100 (40)[20-60]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]
JUNCOM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]	100 (20)[20-20]	0 (0)[0- 0]	0 (0)[0- 0]
LINBOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHILEW	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHYMAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PRUVIR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PURVIR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBCER	20 (1)[1- 1]	50 (1)[1- 1]	50 (1)[1- 1]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBLAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBLUC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBMON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]
ROSACI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ROSWOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
SHECAN	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
SPIBET	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SYMALB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SYMOCC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SYMORE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*PSEMEN/CERLED * N = 5	*PSEMEN/FESIDA * N = 2	*PINFLE/CERLED * N = 2	*PINFLE/FESIDA * N = 1	*PINFLE/JUNCOM * N = 1	*PINFLE/AGRSPI * N = 1	*PINALB/FESIDA * N = 1
***** GRAMINOIDS *****							
AGRCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRSPI	80 (11)[1-20]	100 (21)[1-40]	100 (35)[20-50]	100 (3)[3- 3]	100 (3)[3- 3]	100 (20)[20-20]	0 (0)[0- 0]
ARILON	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BOUGRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]
BROCAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROINE	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALPUR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALRUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARFIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (30)[30-30]	0 (0)[0- 0]
CARGEY	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARROI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARROS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARRST	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSTE	0 (0)[0- 0]	50 (1)[1- 1]	100 (25)[10-40]	0 (0)[0- 0]	100 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]
ELYGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ELYREP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FESIDA	40 (6)[1-10]	100 (17)[3-30]	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	100 (10)[10-10]
FESOCC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HESKIN	0 (0)[0- 0]	50 (10)[10-10]	0 (0)[0- 0]	100 (20)[20-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
KOECRI	0 (0)[0- 0]	50 (1)[1- 1]	100 (12)[3-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ORYHYM	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	100 (20)[20-20]	0 (0)[0- 0]
ORYMIC	0 (0)[0- 0]	0 (0)[0- 0]	100 (12)[3-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAALP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POACUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POANER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (60)[60-60]
POASAN	80 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POASEC	20 (1)[1- 1]	50 (3)[3- 3]	100 (6)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SITHYS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
STICOM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*PSEMEN/CERLED N = 5	*PSEMEN/FESIDA N = 2	*PINFLE/CERLED N = 2	*PINFLE/FESIDA N = 1	*PINFLE/JUNCOM N = 1	*PINFLE/AGRSPI N = 1	*PINALB/FESIDA N = 1
***** FORBS *****							
ACHMIL	0 (0)[0- 0]	50 (1)[1- 1]	50 (1)[1- 1]	100 (1)[1- 1]	0 (0)[0- 0]	100 (1)[1- 1]	100 (1)[1- 1]
ACTRUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ALLBRE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTANA	0 (0)[0- 0]	50 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTMIC	0 (0)[0- 0]	50 (10)[10-10]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]
ANTRAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	100 (1)[1- 1]
ANTUMB	20 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AQUFLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AQUFOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARECON	0 (0)[0- 0]	50 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]
ARNCOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARNLAT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTCON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTENG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTERX	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTMIS	0 (0)[0- 0]	50 (20)[20-20]	0 (0)[0- 0]	100 (1)[1- 1]	100 (1)[1- 1]	100 (1)[1- 1]	100 (1)[1- 1]
ASTPER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CYMBIP	20 (1)[1- 1]	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DRADEN	20 (1)[1- 1]	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
EQUARV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERYGRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FRAVES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FRAVIR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GALBOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GALTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
GERRIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GERVIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GEUMAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GEUTRI	20 (1)[1- 1]	50 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]
HEDSUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HYMACA	0 (0)[0- 0]	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]
LIGFIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LIGUST	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPARG	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MEROBL	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[3- 3]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]
MITSTA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OPUPOL	20 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OSMCHI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OSMDEP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*PSEMEN/CERLED * N = 5	*PSEMEN/FESIDA * N = 2	*PINFLE/CERLED * N = 2	*PINFLE/FESIDA * N = 1	*PINFLE/JUNCOM * N = 1	*PINFLE/AGRSPI * N = 1	*PINALB/FESIDA * N = 1
***** FORBS CONTINUED *****							
PEDRAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PETCAE	0 (0)[0- 0]	0 (0)[0- 0]	100 (25)[20-30]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLALY	0 (0)[0- 0]	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLHOO	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	100 (3)[3- 3]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]
PHLMUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLPUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTDIV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]
SELDEN	20 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENDIM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENSER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SMIRAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SMISTE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SOLGIG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SOLMUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TAROFF	0 (0)[0- 0]	100 (1)[1- 1]	50 (1)[1- 1]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]
THAOCC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
URTDIO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VALACU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VALDIO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*PICON/CARROI * N = 1	*JUNSCO/CERLED * N = 3	*JUNSCO/ARTTRI * N = 1	*POPTRI/POAPRA * N = 2	*POPTRE/THAFEN * N = 3
***** TREES *****					
ABILAS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]
JUNSCO	0 (0)[0- 0]	100 (17)[10-20]	100 (10)[10-10]	100 (2)[1- 3]	0 (0)[0- 0]
PICENG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (1)[1- 1]
PINALB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]
PINCON	100 (20)[20-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PINFLE	100 (20)[20-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]
PINPON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POPTRE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (80)[70-90]
POPTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (80)[70-90]	0 (0)[0- 0]
PSEMEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]
SALEXI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (10)[10-10]	0 (0)[0- 0]
***** SRUBS *****					
ACEGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AMEALN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARCUVA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTFRI	0 (0)[0- 0]	100 (2)[1- 3]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
ARTTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTTSV	0 (0)[0- 0]	67 (10)[10-10]	100 (20)[20-20]	0 (0)[0- 0]	0 (0)[0- 0]
BERREP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (2)[1- 3]
CERLED	0 (0)[0- 0]	100 (27)[20-30]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
JUNCOM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]
LINBOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHILEW	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHYMAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PRUVIR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (1)[1- 1]
PURVIR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBCER	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBLAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBLUC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]
RIBMON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ROSACI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (45)[10-80]	0 (0)[0- 0]
ROSWOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (1)[1- 1]
SHECAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (11)[1-20]
SPIBET	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SYMALB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]
SYMOCC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SYMORE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*PICON/CARROI N = 1	*JUNSCO/CERLED N = 3	*JUNSCO/ARTTRI N = 1	*POPTRI/POAPRA N = 2	*POPTRE/THAFEN N = 3
***** GRASSES *****					
AGRCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]
AGRSPI	0 (0)[0- 0]	100 (20)[10-30]	100 (30)[30-30]	0 (0)[0- 0]	0 (0)[0- 0]
ARILON	0 (0)[0- 0]	33 (10)[10-10]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
BOUGRA	0 (0)[0- 0]	33 (3)[3- 3]	100 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]
BROCAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (10)[10-10]
BROINE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (7)[3-10]	0 (0)[0- 0]
CALCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALPUR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALRUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]
CARFIL	0 (0)[0- 0]	67 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARGEY	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (10)[10-10]	0 (0)[0- 0]
CARROI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARROS	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARRST	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]
CARSTE	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
ELYGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (6)[1-10]
ELYREP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FESIDA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]
FESOCC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HESKIN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
KOECRI	0 (0)[0- 0]	33 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ORYHYM	0 (0)[0- 0]	100 (2)[1- 3]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
ORYMIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[3- 3]	67 (2)[1- 3]
POA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAALP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POACUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POANER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (20)[20-20]	0 (0)[0- 0]
POAPAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (40)[40-40]	0 (0)[0- 0]
POAPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (30)[30-30]	100 (34)[3-90]
POASAN	0 (0)[0- 0]	100 (1)[1- 1]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
POASEC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SITHYS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
STICOM	0 (0)[0- 0]	67 (7)[3-10]	100 (20)[20-20]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*PICON/CARROI * N = 1	*JUNSCO/CERLED * N = 3	*JUNSCO/ARTTRI * N = 1	*POPTRI/POAPRA * N = 2	*POPTRE/THAFEN * N = 3
***** FORBS *****					
ACHMIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (1)[1- 1]
ACTRUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]
ALLBRE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]
ANTANA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTMIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTRAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTUMB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AQUFLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AQUFOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARECON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARNCOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]
ARNLAT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTCON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]
ASTENG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTERX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]
ASTMIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (1)[1- 1]
ASTPER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CYMBIP	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DRADEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
EQUARV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERYGRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FRAVES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FRAVIR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GALBOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (10)[10-10]	100 (2)[1- 3]
GALTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GERRIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]
GERVIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (8)[1-20]
GEUMAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (7)[3-10]
GEUTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HEDSUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HYMACA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LIGFIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LIGUST	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]
LUPARG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (15)[10-20]
MEROBL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MITSTA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OPUPOL	0 (0)[0- 0]	100 (5)[1-10]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
OSMCHI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (20)[20-20]
OSMDEP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (2)[1- 3]

APPENDIX C-1. CONSTANCY/COVER of FORESTED COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*PICON/CARROI * N = 1	*JUNSCO/CERLED * N = 3	*JUNSCO/ARTTRI * N = 1	*POPTRI/POAPRA * N = 2	*POPTRE/THAFEN * N = 3
***** FORBS CONTINUED *****					
PEDRAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PETCAE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLALY	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLHOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLMUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLPUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTDIV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SELDEN	0 (0)[0- 0]	67 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENDIM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENSER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SMIRAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SMISTE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (16)[1-30]	67 (6)[1-10]
SOLGIG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]
SOLMUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TAROFF	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	100 (17)[1-40]
THAOCC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (8)[3-10]
URTDIO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]
VALACU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VALDIO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (1)[1- 1]
VIONUT	14 (1)[1- 1]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*POTFRU/DESCES * N = 4	*POTFRU/POTOVI * N = 2	*ARTLON/FESIDA * N = 6	*ARTLON/AGRDAS * N = 4	*ARTTST/AGRSMI * N = 12	*ARTTST/FESIDA * N = 4	*ARTTST/SITCOM * N = 5 *
***** TREES	*****						
JUNSCO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	25 (1)[1- 1]	0 (0)[0- 0]
PINFLE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PSEMEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** SHRUBS	*****						
ARCUVA	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTARB	0 (0)[0- 0]	0 (0)[0- 0]	100 (18)[10-20]	100 (15)[10-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTFRI	0 (0)[0- 0]	0 (0)[0- 0]	50 (2)[1- 3]	50 (11)[1-20]	33 (23)[1-30]	25 (1)[1- 1]	60 (34)[1-60]
ARTNOV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (10)[10-10]
ARTTRI	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (17)[10-20]	50 (30)[30-30]	60 (27)[20-30]
ARTTRP	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	50 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTTST	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (26)[3-50]	50 (15)[10-20]	40 (15)[10-20]
ARTTSV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (3)[3- 3]	25 (3)[3- 3]	0 (0)[0- 0]
ARTTSW	0 (0)[0- 0]	0 (0)[0- 0]	17 (1)[1- 1]	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ATRGAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CERLAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CERLED	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CHRNAU	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	75 (2)[1- 3]	92 (6)[1-20]	75 (1)[1- 1]	60 (5)[1-10]
CHRVIS	0 (0)[0- 0]	0 (0)[0- 0]	83 (1)[1- 3]	75 (2)[1- 3]	67 (2)[1- 3]	50 (2)[1- 3]	60 (1)[1- 1]
EURLAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GUTSAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	17 (1)[1- 1]	0 (0)[0- 0]	20 (3)[3- 3]
LEPPUN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (1)[1- 1]	25 (1)[1- 1]	60 (4)[1-10]
POTFRU	100 (25)[20-40]	100 (30)[30-30]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBCER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
RIBLAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (3)[3- 3]	0 (0)[0- 0]
ROSWOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (9)[3-20]	0 (0)[0- 0]	0 (0)[0- 0]
SALEXI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SALIX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SALIXX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SARVER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
SYMORE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
TETCAN	0 (0)[0- 0]	0 (0)[0- 0]	50 (2)[1- 3]	25 (10)[10-10]	8 (1)[1- 1]	25 (1)[1- 1]	20 (1)[1- 1]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*POTFRU/DESCES N = 4	*POTFRU/POTOVI N = 2	*ARTLON/FESIDA N = 6	*ARTLON/AGRDAS N = 4	*ARTTST/AGRSMI N = 12	*ARTTST/FESIDA N = 4	*ARTTST/SITCOM N = 5
***** GRAMINOIDS *****							
AGRCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRDAS	0 (0)[0- 0]	0 (0)[0- 0]	83 (6)[1-20]	100 (30)[10-50]	42 (32)[10-80]	25 (3)[3- 3]	20 (1)[1- 1]
AGRSMI	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	75 (33)[10-80]	50 (20)[20-20]	20 (20)[20-20]
AGRSPI	25 (1)[1- 1]	0 (0)[0- 0]	67 (3)[1-10]	50 (2)[1- 3]	42 (5)[1-20]	100 (9)[1-20]	20 (3)[3- 3]
ARILON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]
BOUGRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	40 (30)[10-50]
BROCAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROMUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROTEC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
CALINE	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARAQU	25 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARELE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (10)[10-10]	0 (0)[0- 0]
CAREXX	0 (0)[0- 0]	0 (0)[0- 0]	17 (1)[1- 1]	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
CARFIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]
CARNEB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPET	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]
CARPRA	100 (6)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARROI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]
CARROS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	20 (1)[1- 1]
CARSCI	25 (10)[10-10]	100 (7)[3-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSTE	0 (0)[0- 0]	0 (0)[0- 0]	17 (1)[1- 1]	0 (0)[0- 0]	25 (14)[1-30]	25 (1)[1- 1]	40 (15)[10-20]
CINLAT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
DANINT	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DANUNI	0 (0)[0- 0]	0 (0)[0- 0]	33 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DESCES	75 (18)[3-40]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DISSTR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ELYCIN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	75 (17)[1-90]	25 (1)[1- 1]	0 (0)[0- 0]
FESIDA	25 (20)[20-20]	0 (0)[0- 0]	100 (37)[20-60]	50 (1)[1- 1]	25 (1)[1- 1]	100 (30)[20-40]	40 (35)[30-40]
FESTUC	25 (40)[40-40]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HESKIN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	8 (3)[3- 3]	25 (1)[1- 1]	0 (0)[0- 0]
HORJUB	25 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
JUNBAL	100 (58)[20-80]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
KOECRI	25 (1)[1- 1]	100 (1)[1- 1]	67 (2)[1- 3]	25 (1)[1- 1]	25 (1)[1- 1]	25 (1)[1- 1]	40 (3)[3- 3]
MELBUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MUHRIC	25 (10)[10-10]	100 (7)[3-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ORYHYM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]
PHLALP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POACUS	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[3- 3]	50 (10)[10-10]	8 (1)[1- 1]	25 (3)[3- 3]	0 (0)[0- 0]
POAINT	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	17 (7)[3-10]	0 (0)[0- 0]	0 (0)[0- 0]
POAJUN	0 (0)[0- 0]	100 (2)[1- 3]	17 (1)[1- 1]	50 (12)[3-20]	67 (6)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]
POAPAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*POTFRU/DESCES * N = 4	*POTFRU/POTOVI * N = 2	*ARTLON/FESIDA * N = 6	*ARTLON/AGRDAS * N = 4	*ARTTST/AGRSMI * N = 12	*ARTTST/FESIDA * N = 4	*ARTTST/SITCOM * N = 5
***** GRAMINOIDS CONTINUED *****							
POAPRA	50 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (25)[10-50]	50 (6)[1-10]	0 (0)[0- 0]
POASAN	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (20)[20-20]	0 (0)[0- 0]	20 (1)[1- 1]
POASEC	0 (0)[0- 0]	0 (0)[0- 0]	83 (3)[1- 3]	100 (7)[1-20]	50 (17)[3-30]	100 (2)[1- 3]	20 (10)[10-10]
POAXXX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PUCDIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
STICOM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (46)[20-70]
STIVIR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[1-10]	25 (1)[1- 1]	0 (0)[0- 0]
TRISPI	0 (0)[0- 0]	0 (0)[0- 0]	17 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** FORBS *****							
ACHMIL	50 (1)[1- 1]	100 (1)[1- 1]	50 (5)[1-10]	25 (1)[1- 1]	58 (1)[1- 3]	50 (10)[10-10]	20 (1)[1- 1]
AGOGLA	0 (0)[0- 0]	0 (0)[0- 0]	17 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ALLSCH	75 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ALLTEX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ALYDES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTANA	25 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTCOR	25 (30)[30-30]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTMIC	25 (1)[1- 1]	100 (1)[1- 1]	67 (2)[1- 3]	50 (6)[1-10]	50 (1)[1- 3]	75 (14)[1-20]	0 (0)[0- 0]
ANTPAR	0 (0)[0- 0]	0 (0)[0- 0]	33 (2)[1- 3]	50 (7)[3-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARAFEC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARECON	0 (0)[0- 0]	0 (0)[0- 0]	17 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARNSOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
ASTADS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (1)[1- 1]	25 (3)[3- 3]	0 (0)[0- 0]
ASTAGR	0 (0)[0- 0]	0 (0)[0- 0]	17 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTERX	25 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	25 (10)[10-10]	0 (0)[0- 0]
ASTMIS	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTOCC	75 (4)[1-10]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTSCO	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BALHOO	0 (0)[0- 0]	0 (0)[0- 0]	33 (2)[1- 3]	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BESWYO	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]
CASTIL	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	50 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CENMAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CIRARV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
COMUMB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	75 (1)[1- 1]	60 (1)[1- 1]
CRERUN	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CYMBIP	0 (0)[0- 0]	0 (0)[0- 0]	17 (1)[1- 1]	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
DODCON	0 (0)[0- 0]	0 (0)[0- 0]	17 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERICOM	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	25 (3)[3- 3]	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
ERIUMB	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	40 (1)[1- 1]
FORBPE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (3)[3- 3]	0 (0)[0- 0]
FRAVIR	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GALBOR	75 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GENAFF	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GERVIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	17 (6)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]
GEUTRI	25 (3)[3- 3]	0 (0)[0- 0]	83 (1)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*POTFRU/DESCES * N = 4	*POTFRU/POTOVI * N = 2	*ARTLON/FESIDA * N = 6	*ARTLON/AGRDAS * N = 4	*ARTTST/AGRSMI * N = 12	*ARTTST/FESIDA * N = 4	*ARTTST/SITCOM * N = 5
***** FORBS CONTINUED *****							
HAPACA	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HAPUNI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HEDSUL	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HERLAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HEUGRO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IRIMIS	100 (6)[1-10]	50 (1)[1- 1]	17 (1)[1- 1]	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
LAPRED	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
LINLEW	0 (0)[0- 0]	0 (0)[0- 0]	67 (1)[1- 1]	25 (1)[1- 1]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
LINPER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (20)[20-20]	0 (0)[0- 0]	60 (1)[1- 1]
LITRUD	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	17 (6)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]
LOMCOU	0 (0)[0- 0]	0 (0)[0- 0]	17 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPARG	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	20 (1)[1- 1]
LUPINU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (3)[3- 3]
LUPSER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MEROBL	0 (0)[0- 0]	0 (0)[0- 0]	17 (1)[1- 1]	0 (0)[0- 0]	8 (1)[1- 1]	25 (1)[1- 1]	0 (0)[0- 0]
MERTEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OPUFRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	60 (4)[1-10]
OPUPOL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (1)[1- 1]	25 (3)[3- 3]	40 (6)[1-10]
PARSES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PEDGRO	75 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLHOO	0 (0)[0- 0]	0 (0)[0- 0]	67 (6)[1-10]	75 (2)[1- 3]	25 (1)[1- 1]	50 (2)[1- 3]	40 (1)[1- 1]
PHLMUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLMUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTANS	25 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTGRA	100 (11)[1-40]	50 (1)[1- 1]	17 (1)[1- 1]	0 (0)[0- 0]	17 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]
POTOVI	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PSOTEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (10)[10-10]
SALKAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SAXRHO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENCAN	0 (0)[0- 0]	50 (1)[1- 1]	17 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	25 (10)[10-10]	0 (0)[0- 0]
SENDEB	50 (11)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENINT	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENSPH	25 (20)[20-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENSTR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (4)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]
SMISTE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SOLMUL	0 (0)[0- 0]	0 (0)[0- 0]	33 (6)[1-10]	25 (1)[1- 1]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
TAROFF	75 (2)[1- 3]	100 (1)[1- 1]	83 (1)[1- 1]	25 (1)[1- 1]	67 (1)[1- 3]	75 (10)[1-20]	20 (1)[1- 1]
TRIREP	25 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VALEDU	75 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VIONEP	25 (1)[1- 1]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VIONUT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	8 (3)[3- 3]	25 (1)[1- 1]	0 (0)[0- 0]
***** FERNS & ALLIED TAXA *****							
SELDEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ARTTSV/ELYCIN N = 3	*ARTTSV/FESIDA N = 16	*ARTTSV/AGRSPI N = 10	*ARTNOV/AGRSPI N = 4	*CERLED/FESIDA N = 1	*CERLED/AGRSPI N = 29	*ARTTSW/AGRDAS N = 2
***** TREES *****							
JUNSCO	0 (0)[0- 0]	0 (0)[0- 0]	10 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	48 (5)[1-20]	0 (0)[0- 0]
PINFLE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (3)[3- 3]	0 (0)[0- 0]	10 (2)[1- 3]	0 (0)[0- 0]
PSEMEN	0 (0)[0- 0]	19 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	14 (2)[1- 3]	0 (0)[0- 0]
***** SHRUBS *****							
ARCUVA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	7 (2)[1- 3]	0 (0)[0- 0]
ARTARB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (10)[10-10]	0 (0)[0- 0]	3 (10)[10-10]	0 (0)[0- 0]
ARTFRI	33 (1)[1- 1]	19 (1)[1- 1]	100 (9)[1-40]	100 (6)[1-10]	100 (3)[3- 3]	83 (3)[1-10]	100 (2)[1- 3]
ARTNOV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	75 (30)[20-40]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTTRI	0 (0)[0- 0]	13 (45)[20-70]	20 (20)[10-30]	0 (0)[0- 0]	0 (0)[0- 0]	10 (4)[1-10]	50 (10)[10-10]
ARTTRP	67 (3)[3- 3]	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	10 (1)[1- 1]	0 (0)[0- 0]
ARTTST	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]
ARTTSV	100 (20)[20-20]	88 (30)[10-70]	80 (28)[10-50]	50 (2)[1- 3]	100 (3)[3- 3]	35 (5)[1-20]	0 (0)[0- 0]
ARTTSW	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (10)[10-10]
ATRGAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CERLAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]	7 (1)[1- 1]	50 (10)[10-10]
CERLED	0 (0)[0- 0]	0 (0)[0- 0]	10 (1)[1- 1]	25 (1)[1- 1]	100 (20)[20-20]	100 (35)[10-70]	0 (0)[0- 0]
CHRNAU	67 (2)[1- 3]	19 (5)[1-10]	70 (1)[1- 1]	100 (2)[1- 3]	0 (0)[0- 0]	35 (1)[1- 3]	50 (1)[1- 1]
CHRVIS	67 (2)[1- 3]	44 (1)[1- 3]	30 (1)[1- 1]	50 (2)[1- 3]	100 (1)[1- 1]	38 (4)[1-20]	50 (1)[1- 1]
EURLAN	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]	25 (1)[1- 1]	0 (0)[0- 0]	7 (2)[1- 3]	0 (0)[0- 0]
GUTSAR	0 (0)[0- 0]	13 (1)[1- 1]	70 (2)[1- 3]	50 (2)[1- 3]	0 (0)[0- 0]	35 (2)[1- 3]	50 (1)[1- 1]
LEPPUN	0 (0)[0- 0]	6 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTFRU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBCER	0 (0)[0- 0]	6 (1)[1- 1]	10 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	3 (1)[1- 1]	0 (0)[0- 0]
RIBLAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ROSWOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	3 (1)[1- 1]	0 (0)[0- 0]
SALEXI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SALIX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SALIXX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SARVER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SYMORE	33 (1)[1- 1]	25 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	10 (2)[1- 3]	0 (0)[0- 0]
TETCAN	67 (2)[1- 3]	19 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	31 (1)[1- 3]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ARTTSV/ELYCIN * N = 3	*ARTTSV/FESIDA * N = 16	*ARTTSV/AGRSPI * N = 10	*ARTNOV/AGRSPI * N = 4	*CERLED/FESIDA * N = 1	*CERLED/AGRSPI * N = 29	*ARTTSW/AGRDAS * N = 2
***** GRAMINOIDS *****							
AGRCAN	33 (3)[3- 3]	19 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRDAS	67 (20)[20-20]	31 (7)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	3 (20)[20-20]	50 (10)[10-10]
AGRSMI	0 (0)[0- 0]	0 (0)[0- 0]	20 (20)[10-30]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (30)[30-30]
AGRSPI	33 (1)[1- 1]	63 (17)[3-30]	100 (29)[20-50]	100 (20)[10-40]	100 (30)[30-30]	100 (12)[1-30]	50 (1)[1- 1]
ARILON	0 (0)[0- 0]	0 (0)[0- 0]	10 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	17 (4)[1-10]	50 (1)[1- 1]
BOUGRA	0 (0)[0- 0]	0 (0)[0- 0]	60 (9)[1-30]	0 (0)[0- 0]	0 (0)[0- 0]	17 (7)[1-10]	50 (20)[20-20]
BROCAR	33 (1)[1- 1]	38 (4)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROMUS	33 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROTEC	0 (0)[0- 0]	0 (0)[0- 0]	20 (6)[1-10]	0 (0)[0- 0]	100 (30)[30-30]	0 (0)[0- 0]	0 (0)[0- 0]
CALINE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARAQU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARELE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CAREXX	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	7 (6)[1-10]	0 (0)[0- 0]
CARFIL	0 (0)[0- 0]	6 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	14 (3)[1-10]	0 (0)[0- 0]
CARNEB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPET	0 (0)[0- 0]	31 (1)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPRA	0 (0)[0- 0]	6 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARROI	0 (0)[0- 0]	6 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	21 (5)[1-20]	0 (0)[0- 0]
CARROS	33 (1)[1- 1]	19 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	10 (2)[1- 3]	0 (0)[0- 0]
CARSCI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSTE	0 (0)[0- 0]	0 (0)[0- 0]	30 (2)[1- 3]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	50 (1)[1- 1]
CINLAT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DANINT	33 (1)[1- 1]	19 (8)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DANUNI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DESCES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DISSTR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ELYCIN	100 (40)[20-60]	13 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	3 (1)[1- 1]	50 (1)[1- 1]
FESIDA	100 (37)[10-60]	100 (47)[10-80]	0 (0)[0- 0]	25 (1)[1- 1]	100 (10)[10-10]	10 (2)[1- 3]	0 (0)[0- 0]
FESTUC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HESKIN	0 (0)[0- 0]	6 (1)[1- 1]	0 (0)[0- 0]	25 (3)[3- 3]	0 (0)[0- 0]	14 (2)[1- 3]	0 (0)[0- 0]
HORJUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
JUNBAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
KOECRI	33 (1)[1- 1]	81 (2)[1- 3]	30 (8)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	17 (3)[1-10]	50 (1)[1- 1]
MELBUL	33 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MUHRIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ORYHYM	0 (0)[0- 0]	0 (0)[0- 0]	30 (5)[1-10]	25 (3)[3- 3]	0 (0)[0- 0]	86 (5)[1-20]	50 (3)[3- 3]
PHLALP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POACUS	0 (0)[0- 0]	19 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (20)[20-20]
POAINT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAJUN	67 (2)[1- 3]	6 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	3 (1)[1- 1]	0 (0)[0- 0]
POAPAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPRA	33 (10)[10-10]	38 (16)[1-40]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]
POASAN	0 (0)[0- 0]	31 (2)[1- 3]	80 (9)[1-20]	0 (0)[0- 0]	100 (1)[1- 1]	41 (1)[1- 1]	0 (0)[0- 0]
POASEC	0 (0)[0- 0]	19 (2)[1- 3]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]	10 (2)[1- 3]	50 (3)[3- 3]
POAXXX	0 (0)[0- 0]	6 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ARTTSV/ELYCIN * N = 3	*ARTTSV/FESIDA * N = 16	*ARTTSV/AGRSPI * N = 10	*ARTNOV/AGRSPI * N = 4	*CERLED/FESIDA * N = 1	*CERLED/AGRSPI * N = 29	*ARTTSW/AGRDAS * N = 2
***** GRAMINOIDS CONTINUED *****							
PUCDIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
STICOM	33 (1)[1- 1]	0 (0)[0- 0]	70 (13)[1-30]	50 (2)[1- 3]	100 (1)[1- 1]	41 (7)[1-20]	50 (30)[30-30]
STIVIR	0 (0)[0- 0]	19 (1)[1- 1]	20 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (20)[20-20]
TRISPI	0 (0)[0- 0]	13 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** FORBS *****							
ACHMIL	67 (2)[1- 3]	69 (3)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	28 (1)[1- 3]	0 (0)[0- 0]
AGOGLA	0 (0)[0- 0]	44 (1)[1- 3]	10 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ALLSCH	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ALLTEX	0 (0)[0- 0]	13 (1)[1- 1]	30 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	28 (1)[1- 3]	0 (0)[0- 0]
ALYDES	0 (0)[0- 0]	0 (0)[0- 0]	20 (30)[30-30]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTANA	0 (0)[0- 0]	6 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTCOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTMIC	33 (1)[1- 1]	94 (6)[1-20]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]	14 (1)[1- 1]	0 (0)[0- 0]
ANTPAR	0 (0)[0- 0]	13 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	3 (1)[1- 1]	0 (0)[0- 0]
ARAFEC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	10 (2)[1- 3]	0 (0)[0- 0]
ARECON	0 (0)[0- 0]	38 (5)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	3 (1)[1- 1]	0 (0)[0- 0]
ARNSOR	0 (0)[0- 0]	25 (4)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTADS	0 (0)[0- 0]	0 (0)[0- 0]	10 (1)[1- 1]	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[3- 3]
ASTAGR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTERX	0 (0)[0- 0]	13 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	3 (1)[1- 1]	0 (0)[0- 0]
ASTMIS	0 (0)[0- 0]	13 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	7 (1)[1- 1]	100 (1)[1- 1]
ASTOCC	33 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTSCO	0 (0)[0- 0]	6 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]
BALHOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BESWYO	0 (0)[0- 0]	38 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CASTIL	0 (0)[0- 0]	13 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CENMAC	0 (0)[0- 0]	0 (0)[0- 0]	10 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CIRARV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
COMUMB	33 (1)[1- 1]	19 (1)[1- 1]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]	10 (1)[1- 1]	0 (0)[0- 0]
CRERUN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CYMBIP	0 (0)[0- 0]	6 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	21 (1)[1- 3]	0 (0)[0- 0]
DODCON	0 (0)[0- 0]	25 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERICOM	0 (0)[0- 0]	38 (1)[1- 1]	30 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	21 (1)[1- 1]	0 (0)[0- 0]
ERIUMB	0 (0)[0- 0]	63 (3)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FORBPE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FRAVIR	0 (0)[0- 0]	19 (4)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GALBOR	0 (0)[0- 0]	25 (7)[3-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GENAFF	0 (0)[0- 0]	6 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GERVIS	67 (2)[1- 3]	19 (13)[10-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ARTTSV/ELYCIN * N = 3	*ARTTSV/FESIDA * N = 16	*ARTTSV/AGRSPI * N = 10	*ARTNOV/AGRSPI * N = 4	*CERLED/FESIDA * N = 1	*CERLED/AGRSPI * N = 29	*ARTTSW/AGRDAS * N = 2
***** FORBS CONTINUED *****							
GEUTRI	0 (0)[0- 0]	56 (9)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]
HAPACA	0 (0)[0- 0]	19 (7)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	24 (6)[1-20]	0 (0)[0- 0]
HAPUNI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HEDSUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HERLAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HEUGRO	0 (0)[0- 0]	6 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IRIMIS	33 (1)[1- 1]	13 (6)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	3 (1)[1- 1]	0 (0)[0- 0]
LAPRED	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]	0 (0)[0- 0]	100 (1)[1- 1]	52 (2)[1-10]	0 (0)[0- 0]
LINLEW	0 (0)[0- 0]	19 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	3 (1)[1- 1]	0 (0)[0- 0]
LINPER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]	10 (2)[1- 3]	0 (0)[0- 0]
LITRUD	33 (3)[3- 3]	13 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	14 (1)[1- 1]	0 (0)[0- 0]
LOMCOU	0 (0)[0- 0]	13 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPARG	0 (0)[0- 0]	13 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPINU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPSER	33 (20)[20-20]	44 (6)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MEROBL	33 (1)[1- 1]	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	10 (2)[1- 3]	0 (0)[0- 0]
MERTEN	33 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OPUFRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OPUPOL	33 (3)[3- 3]	6 (1)[1- 1]	80 (2)[1-10]	50 (1)[1- 1]	100 (3)[3- 3]	45 (3)[1-10]	50 (10)[10-10]
PARSES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PEDGRO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLHOO	0 (0)[0- 0]	38 (3)[1-10]	10 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	21 (1)[1- 3]	50 (3)[3- 3]
PHLMUL	0 (0)[0- 0]	13 (6)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	3 (1)[1- 1]	0 (0)[0- 0]
PHLMUS	0 (0)[0- 0]	0 (0)[0- 0]	30 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	21 (1)[1- 3]	0 (0)[0- 0]
POTANS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTGRA	67 (1)[1- 1]	25 (6)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTOVI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	3 (1)[1- 1]	0 (0)[0- 0]
PSOTEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SALKAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	7 (6)[1-10]	0 (0)[0- 0]
SAXRHO	0 (0)[0- 0]	13 (7)[3-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	28 (1)[1- 1]	0 (0)[0- 0]
SENDEB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENINT	0 (0)[0- 0]	25 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENSPH	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENSTR	0 (0)[0- 0]	6 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	3 (1)[1- 1]	0 (0)[0- 0]
SMISTE	0 (0)[0- 0]	6 (20)[20-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SOLMUL	0 (0)[0- 0]	6 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	3 (1)[1- 1]	0 (0)[0- 0]
TAROFF	33 (1)[1- 1]	63 (3)[1-10]	40 (1)[1- 1]	50 (1)[1- 1]	100 (1)[1- 1]	41 (1)[1- 1]	0 (0)[0- 0]
TRIREP	0 (0)[0- 0]	6 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VALEDU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VIONEP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VIONUT	0 (0)[0- 0]	6 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** FERNS & ALLIED TAXA *****							
SELDEN	33 (10)[10-10]	31 (3)[1-10]	20 (11)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	14 (2)[1- 3]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ARTTSW/AGRSPI * N = 3	*ARTTRP/FESIDA * N = 14	*ARTTRP/AGRDAS * N = 2	*ARTTRP/AGRSPI * N = 1	*CHRVIS/STICOM * N = 1	*SARVER/DISSTR * N = 2	*SARVER/AGRSMI * N = 1
***** TREES *****							
JUNSCO	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PINFLE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PSEMEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** SHRUBS *****							
ARCUVA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTARB	0 (0)[0- 0]	7 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTFRI	67 (2)[1- 3]	36 (3)[1-10]	50 (3)[3- 3]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	100 (20)[20-20]
ARTNOV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTTRI	67 (35)[30-40]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTTRP	0 (0)[0- 0]	93 (19)[10-30]	100 (20)[20-20]	100 (20)[20-20]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]
ARTTST	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	50 (1)[1- 1]	100 (3)[3- 3]
ARTTSV	0 (0)[0- 0]	57 (3)[1-10]	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTTSW	33 (20)[20-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]
ATRGAR	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]
CERLAN	67 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CERLED	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CHRNAU	67 (2)[1- 3]	29 (1)[1- 1]	100 (1)[1- 1]	0 (0)[0- 0]	100 (3)[3- 3]	100 (2)[1- 3]	0 (0)[0- 0]
CHRVIS	67 (2)[1- 3]	86 (3)[1-20]	100 (1)[1- 1]	100 (1)[1- 1]	100 (20)[20-20]	0 (0)[0- 0]	0 (0)[0- 0]
EURLAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GUTSAR	67 (7)[3-10]	14 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LEPPUN	67 (1)[1- 1]	14 (1)[1- 1]	50 (1)[1- 1]	100 (1)[1- 1]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
POTFRU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBCER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBLAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ROSWOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SALEXI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SALIX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SALIXX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SARVER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]	100 (10)[10-10]
SYMORE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TETCAN	0 (0)[0- 0]	86 (5)[1-20]	50 (1)[1- 1]	100 (3)[3- 3]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ARTTSW/AGRSPI * N = 3	*ARTTRP/FESIDA * N = 14	*ARTTRP/AGRDAS * N = 2	*ARTTRP/AGRSPI * N = 1	*CHRVIS/STICOM * N = 1	*SARVER/DISSTR * N = 2	*SARVER/AGRSMI * N = 1
***** GRAMINOIDS *****							
AGRCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRDAS	33 (3)[3- 3]	57 (8)[1-40]	100 (30)[10-50]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	100 (70)[70-70]
AGRSMI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]
AGRSPI	100 (27)[20-30]	50 (4)[1-10]	0 (0)[0- 0]	100 (30)[30-30]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARILON	33 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BOUGRA	67 (26)[1-50]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROCAR	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROMUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROTEC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALINE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARAQU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARELE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CAREXX	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARFIL	0 (0)[0- 0]	29 (6)[1-10]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARNEB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPET	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]
CARROI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARROS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSCI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSTE	33 (20)[20-20]	7 (3)[3- 3]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CINLAT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DANINT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DANUNI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DESCES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DISSTR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (20)[20-20]	0 (0)[0- 0]
ELYCIN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]
FESIDA	33 (1)[1- 1]	86 (50)[30-70]	50 (1)[1- 1]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FESTUC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HESKIN	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HORJUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	100 (1)[1- 1]
JUNBAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
KOECRI	33 (3)[3- 3]	79 (2)[1- 3]	50 (3)[3- 3]	100 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MELBUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MUHRIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ORYHYM	67 (11)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
PHLALP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POACUS	33 (3)[3- 3]	36 (2)[1- 3]	100 (12)[3-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAINT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAJUN	0 (0)[0- 0]	21 (2)[1- 3]	50 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	100 (35)[30-40]	100 (3)[3- 3]
POAPAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPRA	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]
POASEC	67 (15)[10-20]	64 (2)[1-10]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ARTTSW/AGRSPI * N = 3	*ARTTRP/FESIDA * N = 14	*ARTTRP/AGRDAS * N = 2	*ARTTRP/AGRSPI * N = 1	*CHRVIS/STICOM * N = 1	*SARVER/DISSTR * N = 2	*SARVER/AGRSMI * N = 1
***** GRAMINOIDS CONTINUED *****							
POAXXX	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[3- 3]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PUCDIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (12)[3-20]	0 (0)[0- 0]
STICOM	67 (26)[1-50]	43 (16)[1-50]	50 (1)[1- 1]	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
STIVIR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TRISPI	0 (0)[0- 0]	7 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** FORBS *****							
ACHMIL	0 (0)[0- 0]	64 (2)[1- 3]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGOGLA	0 (0)[0- 0]	14 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ALLSCH	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ALLTEX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
ALYDES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
ANTANA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTCOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTMIC	33 (10)[10-10]	71 (2)[1- 3]	50 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]
ANTPAR	0 (0)[0- 0]	36 (9)[1-20]	50 (3)[3- 3]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARAFEC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARECON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARNSOR	0 (0)[0- 0]	14 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTADS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTAGR	0 (0)[0- 0]	7 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTERX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTMIS	67 (1)[1- 1]	29 (2)[1- 3]	50 (1)[1- 1]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTOCC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTSCO	33 (1)[1- 1]	14 (2)[1- 3]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BALHOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BESWYO	0 (0)[0- 0]	43 (1)[1- 3]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CASTIL	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CENMAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CIRARV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
COMUMB	0 (0)[0- 0]	50 (1)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CRERUN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CYMBIP	33 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DODCON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERICOM	33 (1)[1- 1]	14 (1)[1- 1]	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERIUMB	0 (0)[0- 0]	29 (3)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FORBPE	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FRAVIR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GALBOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GENAFF	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GERVIS	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GEUTRI	0 (0)[0- 0]	36 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ARTTSW/AGRSPI * N = 3	*ARTTRP/FESIDA * N = 14	*ARTTRP/AGRDAS * N = 2	*ARTTRP/AGRSPI * N = 1	*CHRVIS/STICOM * N = 1	*SARVER/DISSTR * N = 2	*SARVER/AGRSMI * N = 1
***** FORBS CONTINUED *****							
HAPACA	33 (1)[1- 1]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HAPUNI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]
HEDSUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HERLAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HEUGRO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IRIMIS	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LAPRED	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LINLEW	0 (0)[0- 0]	7 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LINPER	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
LITRUD	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LOMCOU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPARG	0 (0)[0- 0]	14 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPINU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPSER	0 (0)[0- 0]	43 (8)[1-20]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MEROBL	0 (0)[0- 0]	21 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MERTEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OPUFRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
OPUPOL	67 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PARSES	0 (0)[0- 0]	14 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PEDGRO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLHOO	67 (1)[1- 1]	64 (3)[1-10]	100 (7)[3-10]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLMUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLMUS	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTANS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTGRA	0 (0)[0- 0]	14 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTOVI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PSOTEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
SALKAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SAXRHO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENCAN	33 (1)[1- 1]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENDEB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENINT	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENSPH	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENSTR	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SMISTE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SOLMUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TAROFF	33 (1)[1- 1]	79 (1)[1- 3]	50 (1)[1- 1]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TRIREP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VALEDU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VIONEP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VIONUT	0 (0)[0- 0]	14 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** FERNS & ALLIED TAXA *****							
SELDEN	0 (0)[0- 0]	7 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ATRGAR/ORYHYM * N = 1	*SALPLA/CARNEB * N = 2	*SALEXI * N = 2
***** TREES *****			
JUNSCO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PINFLE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PSEMEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** SHRUBS *****			
ARCUVA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTARB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTFRI	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
ARTNOV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTTRP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTTST	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTTSV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTTSW	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ATRGAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CERLAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CERLED	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CHRNAU	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
CHRVIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
EURLAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GUTSAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LEPPUN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTFRU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBCER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RIBLAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ROSWOO	0 (0)[0- 0]	0 (0)[0- 0]	50 (10)[10-10]
SALEXI	0 (0)[0- 0]	0 (0)[0- 0]	100 (84)[70-98]
SALIX	0 (0)[0- 0]	100 (12)[3-20]	0 (0)[0- 0]
SALIXX	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]
SARVER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SYMORE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TETCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ATRGAR/ORYHYM * N = 1	*SALPLA/CARNEB * N = 2	*SALEXI * N = 2 *
***** GRAMINOIDS *****			
AGRCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRDAS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRSMI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRSPI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARILON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BOUGRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROCAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROMUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROTEC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALINE	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]
CARAQU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARELE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CAREXX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARFIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARNEB	0 (0)[0- 0]	100 (45)[40-50]	0 (0)[0- 0]
CARPET	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPRA	0 (0)[0- 0]	100 (75)[70-80]	50 (20)[20-20]
CARROI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARROS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSCI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSTE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CINLAT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DANINT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DANUNI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DESCES	0 (0)[0- 0]	100 (3)[3- 3]	50 (1)[1- 1]
DISSTR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ELYCIN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FESIDA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FESTUC	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]
HESKIN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HORJUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
JUNBAL	0 (0)[0- 0]	100 (12)[3-20]	0 (0)[0- 0]
KOECRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MELBUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MUHRIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ORYHYM	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
PHLALP	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]
POACUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAINT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAJUN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPAL	0 (0)[0- 0]	0 (0)[0- 0]	50 (10)[10-10]
POAPRA	0 (0)[0- 0]	0 (0)[0- 0]	50 (60)[60-60]
POASEC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ATRGAR/ORYHYM * N = 1	*SALPLA/CARNEB * N = 2	*SALEXI * N = 2
***** GRAMINOIDS CONTINUED *****			
POAXXX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PUCDIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
STICOM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
STIVIR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TRISPI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** FORBS *****			
ACHMIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGOGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ALLSCH	0 (0)[0- 0]	50 (1)[1- 1]	50 (1)[1- 1]
ALLTEX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ALYDES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTANA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTCOR	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]
ANTMIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTPAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARAFEC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARECON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARNSOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTADS	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
ASTAGR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTERX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTMIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTOCC	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]
ASTSCO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BALHOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BESWYO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CASTIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CENMAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CIRARV	0 (0)[0- 0]	0 (0)[0- 0]	100 (6)[1-10]
COMUMB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CRERUN	0 (0)[0- 0]	50 (3)[3- 3]	50 (30)[30-30]
CYMBIP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DODCON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERICOM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERIUMB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FORBPE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FRAVIR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GALBOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GENAFF	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GERVIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-2. CONSTANCY/COVER of SHRUB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*ATRGAR/ORYHYM * N = 1	*SALPLA/CARNEB * N = 2	*SALEXI * N = 2
***** FORBS CONTINUED *****			
GEUTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HAPACA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HAPUNI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HEDSUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HERLAN	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[3- 3]
HEUGRO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IRIMIS	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]
LAPRED	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LINLEW	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LINPER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LITRUD	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LOMCOU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPARG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPINU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPSER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MEROBL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MERTEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OPUFRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OPUPOL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PARSES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PEDGRO	0 (0)[0- 0]	100 (25)[20-30]	0 (0)[0- 0]
PHLHOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLMUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLMUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTANS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTGRA	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]
POTOVI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PSOTEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SALKAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SAXRHO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENDEB	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]
SENINT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENSPH	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENSTR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SMISTE	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]
SOLMUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TAROFF	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TRIREP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VALEDU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VIONEP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VIONUT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** FERNS & ALLIED TAXA *****			
SELDEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*DESCES N = 2	*JUNBAL-CARPRA N = 13	*ELYCIN-PUCDIS N = 4	*ELEPAL-HORJUB N = 2	*AGRSMI/ALLUVI N = 2	*FESIDA-AGRCAN N = 8	*FESIDA-AGRSPI N = 5
***** SHRUBS *****							
ARTCAN	50 (3)[3- 3]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTFRI	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	60 (7)[1-20]
ARTTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	40 (1)[1- 1]
CHRNAU	0 (0)[0- 0]	0 (0)[0- 0]	75 (5)[1-10]	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	60 (1)[1- 1]
CHRVIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	13 (1)[1- 1]	40 (1)[1- 1]
ERIMIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GUTSAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTFRU	0 (0)[0- 0]	15 (6)[1-10]	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TETCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]
***** GRAMINOIDS *****							
AGRALB	0 (0)[0- 0]	8 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRCAN	0 (0)[0- 0]	23 (7)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (7)[3-10]	0 (0)[0- 0]
AGRDAS	0 (0)[0- 0]	0 (0)[0- 0]	50 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	13 (1)[1- 1]	0 (0)[0- 0]
AGROPY	0 (0)[0- 0]	54 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRSMI	0 (0)[0- 0]	15 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	100 (75)[60-90]	0 (0)[0- 0]	0 (0)[0- 0]
AGRSPI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	13 (1)[1- 1]	80 (25)[10-60]
ARILON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]
BOUGRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROCAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	38 (24)[3-40]	0 (0)[0- 0]
BROTEC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALAMA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALMON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALNEG	0 (0)[0- 0]	15 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALPUR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARAQU	50 (1)[1- 1]	15 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CAREXX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	13 (1)[1- 1]	20 (1)[1- 1]
CARFIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (6)[1-10]	0 (0)[0- 0]
CARNEB	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CAROBT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (12)[3-20]	0 (0)[0- 0]
CARPET	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (3)[3- 3]	0 (0)[0- 0]
CARPHA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	13 (3)[3- 3]	0 (0)[0- 0]
CARPRA	50 (1)[1- 1]	85 (33)[1-90]	50 (6)[1-10]	50 (3)[3- 3]	0 (0)[0- 0]	25 (2)[1- 3]	0 (0)[0- 0]
CARRAY	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	13 (3)[3- 3]	0 (0)[0- 0]
CARROS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	38 (4)[1-10]	0 (0)[0- 0]
CARRUP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSCI	0 (0)[0- 0]	15 (7)[3-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSIM	0 (0)[0- 0]	8 (30)[30-30]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSTE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (10)[10-10]	0 (0)[0- 0]	20 (3)[3- 3]
CARUTR	0 (0)[0- 0]	15 (16)[1-30]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DANINT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	38 (8)[1-20]	20 (20)[20-20]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*DESCES * N = 2	*JUNBAL-CARPRA * N = 13	*ELYCIN-PUCDIS * N = 4	*ELEPAL-HORJUB * N = 2	*AGRSMI/ALLUVI * N = 2	*FESIDA-AGRCAN * N = 8	*FESIDA-AGRSPI * N = 5
***** GRAMINOIDS CONTINUED *****							
DESCES	100 (55) [30-80]	46 (5) [1-10]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
DISSTR	0 (0) [0- 0]	15 (6) [1-10]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
ELEPAU	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
ELYCIN	0 (0) [0- 0]	8 (1) [1- 1]	50 (51) [3-98]	0 (0) [0- 0]	0 (0) [0- 0]	13 (1) [1- 1]	0 (0) [0- 0]
FESIDA	0 (0) [0- 0]	0 (0) [0- 0]	25 (1) [1- 1]	0 (0) [0- 0]	50 (1) [1- 1]	88 (57) [30-70]	100 (38) [20-60]
FESOVI	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
FESRUB	0 (0) [0- 0]	15 (11) [1-20]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
HESKIN	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	13 (10) [10-10]	0 (0) [0- 0]
HORJUB	0 (0) [0- 0]	31 (1) [1- 1]	50 (2) [1- 3]	100 (31) [1-60]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
JUNBAL	100 (45) [20-70]	92 (40) [1-90]	50 (6) [1-10]	0 (0) [0- 0]	50 (1) [1- 1]	0 (0) [0- 0]	0 (0) [0- 0]
KOECRI	0 (0) [0- 0]	31 (1) [1- 1]	50 (1) [1- 1]	0 (0) [0- 0]	50 (20) [20-20]	50 (2) [1- 3]	80 (2) [1- 3]
MELSUB	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	13 (3) [3- 3]	0 (0) [0- 0]
MUHCUS	0 (0) [0- 0]	0 (0) [0- 0]	25 (1) [1- 1]	0 (0) [0- 0]	50 (10) [10-10]	0 (0) [0- 0]	0 (0) [0- 0]
MUHFIL	50 (3) [3- 3]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
MUHRIC	0 (0) [0- 0]	85 (28) [3-60]	25 (3) [3- 3]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
ORYHYM	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
PHAARN	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
PHLALP	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	25 (2) [1- 3]	0 (0) [0- 0]
POACUS	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	25 (3) [3- 3]	20 (1) [1- 1]
POAGLA	0 (0) [0- 0]	8 (3) [3- 3]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
POAINT	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	25 (6) [1-10]	0 (0) [0- 0]
POAJUN	50 (1) [1- 1]	46 (8) [1-30]	75 (17) [10-20]	50 (40) [40-40]	0 (0) [0- 0]	63 (7) [1-20]	0 (0) [0- 0]
POAPAL	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	50 (3) [3- 3]	0 (0) [0- 0]	0 (0) [0- 0]
POAPRA	50 (3) [3- 3]	15 (11) [1-20]	25 (10) [10-10]	0 (0) [0- 0]	50 (10) [10-10]	25 (2) [1- 3]	0 (0) [0- 0]
POASAN	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
POASEC	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	25 (1) [1- 1]	60 (4) [1-10]
PUCDIS	0 (0) [0- 0]	8 (1) [1- 1]	50 (10) [10-10]	50 (1) [1- 1]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
STICOM	0 (0) [0- 0]	0 (0) [0- 0]	25 (1) [1- 1]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]
STIOCC	0 (0) [0- 0]	8 (1) [1- 1]	0 (0) [0- 0]	0 (0) [0- 0]	0 (0) [0- 0]	38 (14) [1-30]	20 (3) [3- 3]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*DESCES * N = 2	*JUNBAL-CARPRA * N = 13	*ELYCIN-PUCDIS * N = 4	*ELEPAL-HORJUB * N = 2	*AGRSMI/ALLUVI * N = 2	*FESIDA-AGRCAN * N = 8	*FESIDA-AGRSPI * N = 5
***** FORBS *****							
ACHMIL	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	88 (4)[1-10]	80 (2)[1- 3]
AGOGLA	0 (0)[0- 0]	8 (1)[1- 1]	25 (3)[3- 3]	0 (0)[0- 0]	50 (1)[1- 1]	63 (2)[1- 3]	0 (0)[0- 0]
ALYDES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTANA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	38 (2)[1- 3]	0 (0)[0- 0]
ANTCOR	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTMIC	0 (0)[0- 0]	62 (3)[1-10]	25 (20)[20-20]	0 (0)[0- 0]	50 (1)[1- 1]	75 (1)[1- 3]	100 (15)[1-70]
ARECON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	88 (1)[1- 3]	20 (1)[1- 1]
AREKIN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]
AREOBT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARERUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTLUD	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	25 (2)[1- 3]	0 (0)[0- 0]
ASTADS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTARG	0 (0)[0- 0]	0 (0)[0- 0]	25 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTFOL	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTLAE	0 (0)[0- 0]	8 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTLEP	0 (0)[0- 0]	31 (4)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTOCC	50 (10)[10-10]	69 (3)[1-10]	25 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	25 (3)[3- 3]	0 (0)[0- 0]
BALHOO	0 (0)[0- 0]	8 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BESWYO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	63 (1)[1- 3]	40 (1)[1- 1]
CERARV	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (6)[1-20]	0 (0)[0- 0]
CHEGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (98)[98-98]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CHRVIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	40 (2)[1- 3]
CIRARV	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
CIRSCA	100 (1)[1- 1]	69 (2)[1-10]	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CIRUND	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
COMUMB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]
CRERUN	50 (3)[3- 3]	62 (1)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CYMBIP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DELGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	63 (1)[1- 3]	0 (0)[0- 0]
DRAOLI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	40 (2)[1- 3]
EPIPAL	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERICOM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (3)[3- 3]	60 (7)[1-20]
ERIFLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (10)[10-10]
ERILON	0 (0)[0- 0]	62 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERIMAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERINAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERIOVC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERITRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERIUMB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	13 (3)[3- 3]	40 (6)[1-10]
FRASPE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]
GALBOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (4)[1-10]	0 (0)[0- 0]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*DESCES N = 2	*JUNBAL-CARPRA N = 13	*ELYCIN-PUCDIS N = 4	*ELEPAL-HORJUB N = 2	*AGRSMI/ALLUVI N = 2	*FESIDA-AGRCAN N = 8	*FESIDA-AGRSPI N = 5
***** FORBS CONTINUED *****							
GENAFF	0 (0)[0- 0]	8 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GERVIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (20)[20-20]	0 (0)[0- 0]
GEUMAC	50 (3)[3- 3]	15 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GEUTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (9)[1-20]	20 (1)[1- 1]
GLAMAR	0 (0)[0- 0]	15 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HACFLO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	13 (10)[10-10]	0 (0)[0- 0]
HAPACA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]
HAPINT	0 (0)[0- 0]	15 (6)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HAPUNI	0 (0)[0- 0]	46 (16)[1-40]	50 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IPOCON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IPOCRE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IRIMIS	100 (1)[1- 1]	46 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IVEGOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LESALP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]
LINLEW	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]
LINPER	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LOMCOU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	13 (3)[3- 3]	0 (0)[0- 0]
LUPARG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (6)[1-10]	0 (0)[0- 0]
LUPSER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	13 (3)[3- 3]	20 (3)[3- 3]
MACCAN	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	13 (1)[1- 1]	0 (0)[0- 0]
MANARV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MEDSAT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MELOFF	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
OPUFRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OPUPOL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OXYCAM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	13 (3)[3- 3]	20 (3)[3- 3]
OXYLAG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]
OXYSER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PARPAL	0 (0)[0- 0]	15 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PEDPAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	13 (1)[1- 1]	0 (0)[0- 0]
PENATT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (6)[1-10]	0 (0)[0- 0]
PENPRO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (3)[3- 3]
PHAHAS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]
PHLHOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[3- 3]	13 (3)[3- 3]	20 (20)[20-20]
PHLKEL	0 (0)[0- 0]	15 (12)[3-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLMUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	40 (20)[20-20]
PHLPUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	13 (3)[3- 3]	0 (0)[0- 0]
POLBIS	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	50 (3)[1- 3]	0 (0)[0- 0]
POTANS	100 (12)[3-20]	46 (9)[1-50]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTDIV	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (7)[3-10]	0 (0)[0- 0]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*DESCES * N = 2	*JUNBAL-CARPRA * N = 13	*ELYCIN-PUCDIS * N = 4	*ELEPAL-HORJUB * N = 2	*AGRSMI/ALLUVI * N = 2	*FESIDA-AGRCAN * N = 8	*FESIDA-AGRSPI * N = 5
***** FORBS CONTINUED *****							
POTGRA	50 (3)[3- 3]	46 (4)[1-10]	25 (3)[3- 3]	0 (0)[0- 0]	50 (1)[1- 1]	63 (5)[1-10]	0 (0)[0- 0]
POTOVI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]
PSOTEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RANCYM	0 (0)[0- 0]	15 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SAXRHO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	25 (2)[1- 3]	0 (0)[0- 0]
SENCAN	0 (0)[0- 0]	0 (0)[0- 0]	25 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]
SENDEB	50 (10)[10-10]	46 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SOLIDA	100 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	13 (1)[1- 1]	0 (0)[0- 0]
SPHCOC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
STELON	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SUADEP	0 (0)[0- 0]	0 (0)[0- 0]	25 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TAROFF	50 (3)[3- 3]	23 (1)[1- 1]	25 (1)[1- 1]	50 (1)[1- 1]	50 (1)[1- 1]	50 (2)[1- 3]	40 (2)[1- 3]
TRIPAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VALEDU	0 (0)[0- 0]	46 (1)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	13 (1)[1- 1]	0 (0)[0- 0]
ZIGVEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	40 (1)[1- 1]
***** FERNS & ALLIED TAXA *****							
EQUHYE	0 (0)[0- 0]	8 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	50 (30)[30-30]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*AGRDAS/PHAHAS * N = 2	*AGRSPI-AGRSMI * N = 2	*AGRSPI-ORYHYM * N = 2	*AGRSPI/CUSH * N = 1	*AGRSPI-POASAN * N = 6	*STICOM/PSOTEN * N = 3	*STICOM-BOUGRA * N = 5
***** SHRUBS *****							
ARTCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTFRI	50 (1)[1- 1]	100 (6)[1-10]	50 (1)[1- 1]	0 (0)[0- 0]	83 (4)[1-10]	0 (0)[0- 0]	100 (15)[1-60]
ARTTRI	50 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CHRNAU	100 (6)[1-10]	50 (1)[1- 1]	100 (1)[1- 1]	0 (0)[0- 0]	50 (1)[1- 1]	100 (2)[1- 3]	20 (1)[1- 1]
CHRVIS	100 (2)[1- 3]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	33 (20)[20-20]	0 (0)[0- 0]
ERIMIC	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	83 (1)[1- 3]	0 (0)[0- 0]	20 (1)[1- 1]
GUTSAR	0 (0)[0- 0]	50 (3)[3- 3]	100 (1)[1- 1]	0 (0)[0- 0]	67 (6)[1-10]	0 (0)[0- 0]	80 (3)[1-10]
POTFRU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TETCAN	100 (1)[1- 1]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	33 (2)[1- 3]	67 (2)[1- 3]	20 (1)[1- 1]
***** GRAMINOIDS *****							
AGRALB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRDAS	100 (11)[1-20]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (7)[1-20]	40 (1)[1- 1]
AGROPY	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRSMI	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	40 (40)[20-60]
AGRSPI	0 (0)[0- 0]	100 (15)[10-20]	100 (2)[1- 3]	100 (10)[10-10]	100 (29)[3-90]	0 (0)[0- 0]	20 (3)[3- 3]
ARILON	0 (0)[0- 0]	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BOUGRA	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	17 (1)[1- 1]	0 (0)[0- 0]	60 (41)[3-70]
BROCAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	40 (11)[1-20]
BROTEC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	17 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]
CALAMA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALMON	0 (0)[0- 0]	50 (30)[30-30]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (1)[1- 1]	0 (0)[0- 0]
CALNEG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALPUR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARAQU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CAREXX	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARFIL	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	100 (10)[10-10]	33 (1)[1- 1]	0 (0)[0- 0]	60 (2)[1- 3]
CARNEB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CAROBT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPET	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPHA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARRAY	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARROS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]
CARRUP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSCI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSIM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSTE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]	80 (2)[1- 3]
CARUTR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DANINT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*AGRDAS/PHAHAS * N = 2	*AGRSPI-AGRSMI * N = 2	*AGRSPI-ORYHYM * N = 2	*AGRSPI/CUSH * N = 1	*AGRSPI-POASAN * N = 6	*STICOM/PSOTEN * N = 3	*STICOM-BOUGRA * N = 5
***** GRAMINOIDS CONTINUED *****							
DESCES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DISSTR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ELEPAU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ELYCIN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FESIDA	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FESOVI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FESRUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HESKIN	0 (0)[0- 0]	50 (10)[10-10]	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HORJUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
JUNBAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
KOECRI	100 (1)[1- 1]	100 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	83 (5)[1-20]	33 (1)[1- 1]	80 (14)[1-30]
MELSUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MUHCUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MUHFIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MUHRIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ORYHYM	100 (7)[3-10]	0 (0)[0- 0]	100 (10)[10-10]	0 (0)[0- 0]	67 (4)[1-10]	100 (2)[1- 3]	0 (0)[0- 0]
PHAARN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLALP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POACUS	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAINT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAJUN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POASAN	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (6)[1-10]	33 (10)[10-10]	20 (10)[10-10]
POASEC	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]	100 (1)[1- 1]	33 (2)[1- 3]	0 (0)[0- 0]	80 (23)[1-40]
PUCDIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
STICOM	50 (20)[20-20]	50 (20)[20-20]	0 (0)[0- 0]	0 (0)[0- 0]	50 (5)[3-10]	100 (14)[3-20]	100 (56)[30-80]
STIOCC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*AGRDAS/PHAHAS N = 2	*AGRSPI-AGRSMI N = 2	*AGRSPI-ORYHYM N = 2	*AGRSPI/CUSH N = 1	*AGRSPI-POASAN N = 6	*STICOM/PSOTEN N = 3	*STICOM-BOUGRA N = 5
***** FORBS *****							
ACHMIL	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGOGLA	50 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ALYDES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]	0 (0)[0- 0]
ANTANA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTCOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTMIC	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	100 (3)[3- 3]	17 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
ARECON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AREKIN	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	50 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]
AREOBT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARERUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTLUD	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]
ASTADS	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	17 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]
ASTARG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTFOL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTLAE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTLEP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTOCC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BALHOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BESWYO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CERARV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CHEGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CHRVIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	17 (1)[1- 1]	0 (0)[0- 0]	40 (1)[1- 1]
CIRARV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CIRSCA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CIRUND	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	33 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]
COMUMB	50 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	50 (4)[1-10]	67 (1)[1- 1]	0 (0)[0- 0]
CRERUN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CYMBIP	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	100 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DELGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DRAOLI	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	100 (3)[3- 3]	33 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
EPIPAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERICOM	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]	100 (1)[1- 1]	33 (1)[1- 1]	0 (0)[0- 0]	20 (1)[1- 1]
ERIFLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERILON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERIMAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	17 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
ERINAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERIOVC	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (3)[3- 3]	0 (0)[0- 0]
ERITRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERIUMB	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FRASPE	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GALBOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*AGRDAS/PHAHAS * N = 2	*AGRSPI-AGRSMI * N = 2	*AGRSPI-ORYHYM * N = 2	*AGRSPI/CUSH * N = 1	*AGRSPI-POASAN * N = 6	*STICOM/PSOTEN * N = 3	*STICOM-BOUGRA * N = 5
***** FORBS CONTINUED *****							
GENAFF	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GERVIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GEUMAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GEUTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GLAMAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HACFLO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HAPACA	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	100 (1)[1- 1]	83 (2)[1- 3]	0 (0)[0- 0]	20 (1)[1- 1]
HAPINT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HAPUNI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IPOCON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	17 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
IPOCRE	0 (0)[0- 0]	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IRIMIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IVEGOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LESALP	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	100 (3)[3- 3]	33 (2)[1- 3]	0 (0)[0- 0]	20 (1)[1- 1]
LINLEW	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	33 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]
LINPER	100 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	100 (7)[1-20]	0 (0)[0- 0]
LOMCOU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPARG	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPSER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MACCAN	50 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	17 (1)[1- 1]	100 (1)[1- 1]	0 (0)[0- 0]
MANARV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MEDSAT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	40 (7)[3-10]
MELOFF	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	40 (16)[1-30]
OPUFRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	67 (7)[3-10]	0 (0)[0- 0]
OPUPOL	50 (1)[1- 1]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	67 (6)[1-20]	33 (3)[3- 3]	40 (12)[3-20]
OXYCAM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (10)[10-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OXYLAG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OXYSER	0 (0)[0- 0]	50 (1)[1- 1]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	20 (1)[1- 1]
PARPAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PEDPAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PENATT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PENPRO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHAHAS	100 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (2)[1- 3]	0 (0)[0- 0]
PHLHOO	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	100 (3)[3- 3]	83 (1)[1- 3]	33 (1)[1- 1]	20 (1)[1- 1]
PHLKEL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLMUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	17 (1)[1- 1]	0 (0)[0- 0]	20 (1)[1- 1]
PHLPUL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POLBIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTANS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTDIV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*AGRDAS/PHAHAS * N = 2	*AGRSPI-AGRSMI * N = 2	*AGRSPI-ORYHYM * N = 2	*AGRSPI/CUSH * N = 1	*AGRSPI-POASAN * N = 6	*STICOM/PSOTEN * N = 3	*STICOM-BOUGRA * N = 5
***** FORBS CONTINUED *****							
POTGRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTOVI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PSOTEN	50 (30)[30-30]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (5)[3-10]	0 (0)[0- 0]
RANCYM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SAXRHO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENCAN	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	17 (1)[1- 1]	0 (0)[0- 0]	40 (1)[1- 1]
SENDEB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SOLIDA	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SPHCOC	0 (0)[0- 0]	0 (0)[0- 0]	50 (1)[1- 1]	0 (0)[0- 0]	33 (1)[1- 1]	0 (0)[0- 0]	80 (3)[1-10]
STELON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SUADEP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TAROFF	0 (0)[0- 0]	50 (1)[1- 1]	50 (1)[1- 1]	100 (1)[1- 1]	17 (3)[3- 3]	0 (0)[0- 0]	60 (1)[1- 1]
TRIPAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
VALEDU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ZIGVEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** FERNS & ALLIED TAXA *****							
EQUHYE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*CARRUP/POTOVI * N = 5	*CARROS * N = 1	*CARSIM * N = 4	*PHAARU * N = 1
***** SHRUBS *****				
ARTCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTFRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTTRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CHRNAU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CHRVIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERIMIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GUTSAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTFRU	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
TETCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** GRAMINOIDS *****				
AGRALB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRCAN	40 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRDAS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGROPY	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRSMI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGRSPI	40 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARILON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BOUGRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROCAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BROTEC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALAMA	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]
CALMON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALNEG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CALPUR	80 (8)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARAQU	0 (0)[0- 0]	100 (20)[20-20]	0 (0)[0- 0]	0 (0)[0- 0]
CAREXX	80 (4)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARFIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARNEB	0 (0)[0- 0]	0 (0)[0- 0]	50 (17)[3-30]	0 (0)[0- 0]
CAROBT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPET	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPHA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARRAY	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARROS	20 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARRUP	60 (40)[10-60]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSCI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARSIM	0 (0)[0- 0]	0 (0)[0- 0]	100 (68)[50-80]	0 (0)[0- 0]
CARSTE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CARUTR	0 (0)[0- 0]	100 (70)[70-70]	0 (0)[0- 0]	0 (0)[0- 0]
DANINT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*CARRUP/POTOVI * N = 5	*CARROS * N = 1	*CARSIM * N = 4	*PHAARU * N = 1
***** GRAMINOIDS CONTINUED *****				
DESCES	0 (0)[0- 0]	100 (1)[1- 1]	75 (2)[1- 3]	0 (0)[0- 0]
DISSTR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ELEPAU	0 (0)[0- 0]	0 (0)[0- 0]	25 (10)[10-10]	0 (0)[0- 0]
ELYCIN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FESIDA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FESOVI	60 (11)[3-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FESRUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HESKIN	20 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HORJUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
JUNBAL	0 (0)[0- 0]	100 (10)[10-10]	25 (3)[3- 3]	0 (0)[0- 0]
KOECRI	100 (1)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MELSUB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MUHCUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MUHFIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MUHRIC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ORYHYM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHAARN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (98)[98-98]
PHLALP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POACUS	40 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAINT	40 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAJUN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POAPAL	0 (0)[0- 0]	100 (3)[3- 3]	0 (0)[0- 0]	100 (10)[10-10]
POAPRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POASAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POASEC	80 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PUCDIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
STICOM	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
STIOCC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*CARRUP/POTOVI * N = 5	*CARROS * N = 1	*CARSIM * N = 4	*PHAARU * N = 1
***** FORBS *****				
ACHMIL	40 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AGOGLA	80 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ALYDES	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTANA	60 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTCOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ANTMIC	60 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARECON	40 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AREKIN	60 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
AREOBT	100 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARERUB	100 (1)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ARTLUD	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTADS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTARG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTFOL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTLAE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTLEP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ASTOCC	0 (0)[0- 0]	0 (0)[0- 0]	25 (1)[1- 1]	0 (0)[0- 0]
BALHOO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
BESWYO	40 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CERARV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CHEGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CHRVIL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CIRARV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]
CIRSCA	0 (0)[0- 0]	100 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]
CIRUND	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
COMUMB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CRERUN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
CYMBIP	40 (11)[1-20]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DELGLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
DRAOLI	20 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
EPIPAL	0 (0)[0- 0]	0 (0)[0- 0]	75 (4)[1-10]	0 (0)[0- 0]
ERICOM	100 (1)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERIFLA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERILON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERIMAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERINAN	40 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERIOVC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERITRI	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ERIUMB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
FRASPE	100 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*CARRUP/POTOVI * N = 5	*CARROS * N = 1	*CARSIM * N = 4	*PHAARU * N = 1
***** FORBS CONTINUED *****				
GALBOR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GENAFF	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GERVIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GEUMAC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GEUTRI	20 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
GLAMAR	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HACFLO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HAPACA	20 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HAPINT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
HAPUNI	20 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IPOCON	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IPOCRE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IRIMIS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
IVEGOR	60 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LESALP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LINLEW	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LINPER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LOMCOU	80 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPARG	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
LUPSER	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MACCAN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MANARV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	100 (3)[3- 3]
MEDSAT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
MELOFF	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OPUFRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OPUPOL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OXYCAM	80 (3)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OXYLAG	20 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
OXYSER	20 (3)[3- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PARPAL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PEDPAR	100 (3)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PENATT	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PENPRO	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHAHAS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLHOO	80 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLKEL	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLMUS	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PHLPUL	80 (6)[1-10]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POLBIS	60 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]

APPENDIX C-3. CONSTANCY/COVER of HERB COMMUNITY TYPES/PLANT ASSOCIATIONS

Species Abbreviations	*CARRUP/POTOVI * N = 5	*CARROS * N = 1	*CARSIM * N = 4	*PHAARU * N = 1
***** FORBS CONTINUED *****				
POTANS	0 (0)[0- 0]	0 (0)[0- 0]	25 (10)[10-10]	0 (0)[0- 0]
POTDIV	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTGRA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
POTOVI	80 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
PSOTEN	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
RANCYM	0 (0)[0- 0]	0 (0)[0- 0]	75 (4)[1-10]	0 (0)[0- 0]
SAXRHO	60 (1)[1- 1]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENCAN	100 (1)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SENDEB	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SOLIDA	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
SPHCOC	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
STELON	0 (0)[0- 0]	0 (0)[0- 0]	25 (3)[3- 3]	0 (0)[0- 0]
SUADEP	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TAROFF	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
TRIPAL	0 (0)[0- 0]	0 (0)[0- 0]	75 (15)[1-40]	0 (0)[0- 0]
VALEDU	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
ZIGVEN	40 (2)[1- 3]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]
***** FERNS & ALLIED TAXA *****				
EQUHYE	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]	0 (0)[0- 0]